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Motive-Directed Meter

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Abstract

Motive-Directed Meter

Daniel Nathan Cox

2021

This dissertation isolates, defines, and explores the phenomenon of *Motive-Directed Meter* (MDM), which has hitherto received little scholarly attention. MDM is a listening experience evoked by music that is temporally regular enough to encourage metric listening and prediction, but irregular enough to frustrate these behaviors. MDM arises when recurring musical motives suggest parallel metric hearings, but shifting durational spans make metrical parallelism difficult to achieve. Listeners are therefore caught in a state of expectational limbo, urged to continually revise predictions that are recurrently thwarted.

To approach this phenomenon, Chapter 1 describes the model of musical meter that undergirds this project, in which meter is viewed as an experiential process of temporal orientation taking place in the mind and body of a listener. Central to this dissertation is the notion that, like temporal orientation itself, the category “metric music” is not binary but graded, permitting degrees of inclusion; this removes the need to determine whether MDM can be considered “metric.” In order to accommodate this fluid conception, a flexible model of meter is introduced, which assesses the entrained listening experience according to four continua: *timepoint specificity*, *pulse periodicity*, *hierarchic depth*, and *motivic saturation*. These criteria are combined to create the multidimensional *Flexible Metric Space*, which accommodates all metric experiences, including Motive-Directed Meter, traditionally deep meter, and any other listening experience arising from synchronization with felt pulsation. This graded approach to membership in “metric music” allows analysts to compare and contrast musics from diverse repertoires.

After Chapter 1 defines Motive-Directed Meter and the model of meter in which it is situated, Chapter 2 introduces five analytic tools appropriate to MDM. Some of these are adapted, some are newly developed, and each captures a different aspect of real-time listening. First, *motive maps* provide visual representations that summarize and highlight relationships between motives and durational spans, providing an overview of the interplay between these domains. Second, the *variability index* ranks categories of meter according to entrainment difficulty in isolation. Taken together, these two methods provide a rough picture of the shifting levels of unpredictability across a given passage of MDM. Third, Mark Gotham's *metric relations* describe the relative difficulty and quality of connections between adjacent meters, further refining the processual approach undertaken here. Fourth, the *metric displacement* technique assesses the degree of mismatch between a listener's expectations and realized musical events, comparing the expected metric depth—roughly, the metric strength—of certain important musical events with the “actual,” realized metric depth of those moments. This technique thereby describes the magnitude of the entrainment shift a listener must undertake in order to adjust to musical events at unexpected temporal positions. Fifth and finally, three *expectation-generation methods* are used to produce hypothetical sets of predictions intended to roughly approximate listener expectations at various stages of the learning process; these are *local inertia*, *motivic inertia*, and *prototype* methods.

The utility of these analytic techniques is highlighted by way of a diverse series of analyses. Chapters 2 and 3 focus on the music of Igor Stravinsky: Chapter 2 analyzes brief passages from the *Rite of Spring*, the *Soldier's Tale*, and *Petrushka*, while Chapter 3 delves deeply into three large works: the “Sacrificial Dance” and “Glorification of the Chosen One” from the *Rite of Spring*, and the “Feast at the Emperor's Palace” from the *Song of the Nightingale*. Chapter 4 then moves beyond Stravinsky to explore the music of a large number of late twentieth- and early twenty-first century composers and popular

music artists working in diverse styles and genres. The artists studied in this chapter include the composers Meredith Monk and Julia Wolfe, and the groups Rolo Tomassi and Mayors of Miyazaki.

The analyses comprising this dissertation employ an experiential perspective, combining the techniques outlined above in order to better understand how we as listeners may work to orient ourselves to these pieces of music. In contrast to traditional structuralist approaches, all of the analyses presented in chapters 2-4, as well as the tools supporting them, are directed at the listening experience. Indeed, this dissertation—from its conceptions about meter and the tools it introduces, to the analyses that stem from both—is driven by a belief that the experience of the listener must lie at the heart of the analytic process. Central to all of the analyses is thus this aim: to illustrate how Motive-Directed Meter arises and to elucidate what it feels like to listen to it. With hope, this experience-driven approach may serve as a starting point for others seeking to similarly represent musical meter.

Motive-Directed Meter

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Daniel Nathan Cox

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GLOSSARY OF TERMS AND ABBREVIATIONS

[#]d	Metric displacement value
B	Beat Cardinality relation (Gotham, 2015)
FMS	Flexible Metric Space
L	Local inertia
LMP	The combination of local inertia, motivic inertia, and prototype approaches
I	Identity relation (Gotham, 2015)
M	Motivic inertia
MDM	Motive-Directed Meter
MWFR	Metrical Well-Formedness Rule (Lerdahl and Jackendoff, 1983)
O	Non-Saturated Order relation (Gotham, 2015)
P	Prototype
P	Sub-Tactus Pulse Cardinality relation (Gotham, 2015)
PPR	Prototype Preference Rule
U	Unordered Sub-/Super-Set relation (Gotham, 2015)
V	Vector Identity relation (Gotham, 2015)
VI	Variability index

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CHAPTER 1 | TIME & SPACE

I. GETTING SITUATED

Meter is fundamentally a system of orientation. As tonality positions us in pitch space, so meter positions us in time. “Temporal orientation,” writes William Friedman, “may reasonably be defined as the ability to determine the current time and the relative times of other events with respect to some temporal framework. To be temporally oriented, we need to be able to identify the present time...but we also need to know where that time falls relative to other time markers and important events.”¹

Musical time is a unique sort of time, distinct from the temporal flow of everyday life; the ability to situate oneself in this rarified space therefore requires predictions of a particularly musical nature.² This is the domain of musical meter, a psychological phenomenon of mental—and, crucially, of bodily—synchronization with a musical signal that affords it. David Huron has noted the many evolutionary advantages of such synchronization which, facilitating prediction, allows us to optimally allocate energetic and attentional resources to respond to our environments.³

Mari Riess Jones’ influential theory of “Rhythmic Attending” makes the case for a close correlation between attentional energy and metric strength, suggesting that attention is directed toward certain significant events within the metric hierarchy, such as the downbeat.⁴ This term “downbeat” is sure to elicit images of metric notation, replete with meter signatures, barlines, and

¹ William J. Friedman, *About Time: Inventing the Fourth Dimension* (Cambridge, MA: MIT Press, 1990), 68.

² Jonathan D. Kramer, *The Time of Music: New Meanings, New Temporalities, New Listening Strategies* (New York: Schirmer Books, 1988), 3-12.

³ David Huron, *Sweet Anticipation: Music and the Psychology of Expectation* (Cambridge, MA: MIT Press, 2006), 176.

⁴ Mari Riess Jones, "Time, Our Lost Dimension: Toward a New Theory of Perception, Attention, and Memory," *Psychological Review* 83, no. 5 (1976).

notated rhythmic values. Yet although I am treating meter as a psychological, rather than notational phenomenon, we are not therefore bound to cast aside all of the familiar symbolism with which we're used to representing it graphically. John Ito argues that many features of traditional Western rhythmic notation, when used appropriately, aptly describe aspects of felt metrical experience. "In metrical orientation," he writes, "the temporal framework used to determine current and relative times is a template that corresponds closely to traditional understandings of meter within the measure. Metrical orientation involves hearing in terms of a heard measure, a relatively short window of time that is a salient locus of concern and attention. ...Heard measures are initiated and anchored by heard downbeats that serve as primary landmarks for temporal orientation within the heard measure."⁵ Indeed, just as the tonic pitch serves as the central orienting locus for all pitch activity in tonal musics, the downbeat functions as the attentional focal point in metered musics.

Although there may be only one tonic in pitch space, the temporal nature of meter necessitates that these orienting (heard) downbeats recur with some consistency; in most Western musics they return with a periodic regularity. Each felt downbeat occurs at a particular moment in time—a *timepoint*—and these timepoints, occurring in succession, comprise one particular *pulse* called the downbeat pulse.⁶ This pulse does not exist in isolation, but is surrounded by a number of other felt pulses that together comprise the *metric hierarchy*, the totality of which accounts for the perceptual phenomenon of musical meter.⁷ We synchronize with such pulses in two stages: we first *abstract* the temporal pattern to which we are attending, which then results in the *generation* of a set of

⁵ John Paul Ito, "Hypermetrical Schemas, Metrical Orientation, and Cognitive-Linguistic Paradigms," *Journal of Music Theory* 57, no. 1 (2013): 59-60.

⁶ A more detailed definition and explanation of meter follows in Part II.

⁷ This definition is adapted from Richard Cohn's definition. Richard Cohn, "Meter," in *The Oxford Handbook of Critical Concepts in Music Theory*, ed. Alexander Rehding and Steven Rings (New York: Oxford University Press, 2020), 210-15.

expectancies regarding the continuation of that pattern.⁸ This process of synchronization, known as *entrainment*, takes place in our bodies and minds, even without our conscious awareness. Once we've abstracted the metric hierarchy, we rely on the principle of metric *inertia* to carry us forward. Inertia, as Carl Schachter describes, is the principle of cognitive economy that explains how metric hierarchies "Persist in the listener's consciousness without special sensory reinforcement. Indeed, they can persist for a time in the face of strongly contradictory signals."⁹ Simply put, it is more efficient to maintain an achieved state of synchrony with the musical signal than to switch in order to lock in an entirely new hierarchy.

An invariant metric hierarchy provides an advantage: we are able to remain consistently oriented to the music without the need for difficult adjustments. Likewise, the principle of *motivic parallelism* encourages us to hear the same musical material at the same position in the metric hierarchy every time that material repeats. This principle is so strong that Fred Lerdahl and Ray Jackendoff make it the first of their Metric Preference Rules, stating, "Where two or more groups can be construed as parallel, they preferably receive parallel metrical structure."¹⁰ Numerous studies have demonstrated that listeners do in fact encode metrical information along with other motivic features. Dirk-Jan Povel and Peter Essens showed in their landmark 1985 study that listeners had difficulty recognizing rhythmic patterns when the underlying "clock"—that is, pulse—was changed relative to the context in which the patterns were first learned.¹¹ Sarah Creel has more recently confirmed these

⁸ Mari Riess Jones, "Learning and the Development of Expectancies: An Interactionist Approach," *Psychomusicology* 9, no. 2 (1990).

⁹ Carl Schachter, "Rhythm and Linear Analysis: Aspects of Meter," in *Music Forum*, ed. Felix Salzer and Carl Schachter (New York, NY: Columbia University Press, 1987), 5.

¹⁰ Fred Lerdahl and Ray Jackendoff, *A Generative Theory of Tonal Music* (Cambridge, MA: MIT Press, 1983), 75.

¹¹ Dirk-Jan Povel and Peter Essens, "Perception of Temporal Patterns," *Music Perception* 2, no. 4 (1985).

observations, showing how listeners retain significant “contextual” information into musical memory, including specific metrical environments, and that this information is re-activated as remembered patterns recur during the listening experience.¹² In response to similar results, Stephanie Acevedo et al. have proposed a “metrical encoding hypothesis,” which suggests that the “Metrical context in which a musical pattern is presented plays an important role in the way the pattern is mentally encoded,” in support of the observed “fact that the same melody in different metrical contexts can seem quite different.”¹³

Thankfully, most musics permit us to satisfy these two needs of inertia and parallelism simultaneously; in other words, most musics enable entrainment of generally stable, consistent metric hierarchies in which repeating musical material recurs at consistent metric positions. But consider Example 1.1a, a passage I’ve transcribed from Missy Mazzoli’s 2012 opera *Song from the Uproar: The Lives and Deaths of Isabelle Eberhardt*, in which a snappy flute melody floats alone above rustling chordal piano accompaniment. Only the main melody is notated here. The brackets above the staff depict my motivic parsing of the passage; other plausible interpretations might well be offered instead. Letters are used to distinguish discrete motives from one another, while prime symbols (′) denote different variants from the original motive forms.¹⁴ This particular rendition views the passage as comprising a near-regular alternation between motives A and B: motive A features staccato quarter notes and leaping motion, while B comprises slurred eighth notes and largely stepwise motion. I’ve coordinated motivic and metric structure in this transcription, resulting in the highly irregular series of metric changes evinced by the frequent changes of time signature. It’s worth reiterating that this

¹² Sarah C. Creel, “Specific Previous Experience Affects Perception of Harmony and Meter,” *Journal of Experimental Psychology: Human Perception and Performance* 37, no. 5 (2011).

¹³ Stefanie Acevedo, David Temperley, and Peter Q. Pfordresher, “Effects of Metrical Encoding on Melody Recognition,” *Music Perception* 31, no. 4 (2014): 373.

¹⁴ I’ve applied prime symbols for changes in total duration, but not for other forms of motivic variation.

0:36 ♩ = 194

A B A' B' A''

A B A' B' A'''

A B' A' A B'' A

A''' B''' A''' B''' A B'' A

The hearing depicted in Example 1.1a is a *parallelistic* hearing. The coordination between motivic events (brackets) and metric events (barlines) indicates that a listener experiencing this set of musical events in this way satisfies the requirements of motivic parallelism quite well. Metric inertia, however, is an altogether different story; this preference is satisfied only in measures 12 and 13 of the transcription, where the 9/8 (2223) meter established in measure 11 persists for two additional bars.¹⁵

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Contrast this with Example 1.1b, which presents the exact same set of note onset events situated within a fundamentally different metric experience. In this example, a consistent (heard) 2/4 meter underscores this entire passage, marking this as an *inertial* hearing that satisfies the demands of metric inertia throughout. Listening in this way, we never have to adjust our temporal orientation.¹⁶ Yet as the nonalignment of motivic brackets and metric barlines makes clear, parallelism is not satisfied in Example 1.1b; rather, motives appear at quite different metric positions as they recur throughout the excerpt.

0:36 ♩ = 194

A B A' B' A'' A

(A) B A' B' A'''

15 A B' A' A B'' A A'''

(A''') B''' A''' B''' A B'' A

23

Example 1.1b. A transcribed passage from *Song of the Uproar* by Missy Mazzoli (Mazzoli, 2012), “inertial” hearing

¹⁶ The terms *inertial* and *parallelistic* are analogous to Andrew Imbrie’s “conservative” and “radical” hearings, but avoid a sense of value judgement and potentially political undertones. See Andrew Imbrie, ““Extra” Measures and Metrical Ambiguity in Beethoven,” in *Beethoven Studies*, ed. Alan Tyson (New York: W.W. Norton, 1973).

Missy Mazzoli's music creates a fundamental tension here, forcing listeners, however subconsciously, to make a choice: pursue a parallelistic or inertial listening strategy, but never both simultaneously.¹⁷ This tension exists because, although both metric interpretations are plausible, several studies have demonstrated that listeners cannot engage two metric hearings simultaneously; true psychological "polymeter" cannot exist.¹⁸ Several structural musical features combine to produce this tension, but for the moment we'll consider only two. First, the passage features a small number of distinct motivic ideas that, through repetition, become familiar enough to enable clear suggestion of parallelism. Second, these motives each appear in a large number of durational forms. The combination of these two features—familiar motivic content with rapidly changing durational spans—unite to create a perceptually potent combination that threads a delicate balance between structure and chaos, as the comfort provided by the familiarity of the recurrent melodic and rhythmic cells is nearly overwhelmed by the jarring unpredictability of their lengths and sequencing. Analyzing a metrically and motivically similar passage from Stravinsky's *Les Noces*, Justin London suggests that, "Metrically, the result is that, although we know what to do and what to expect...we cannot know exactly *when* to expect it."¹⁹

¹⁷ This tension has been noted previously with regard to the music of Igor Stravinsky; Pieter van den Toorn describes the "double edge" of tension between motive and meter in Stravinsky's work. See Pieter C. van den Toorn, *Stravinsky and the Rite of Spring: The Beginnings of a Musical Language* (Berkeley: University of California Press, 1987), 83. See also "The Rite of Spring Briefly Revisited: Thoughts on Stravinsky's Stratifications, the Psychology of Meter, and African Polyrhythm," *Music Theory Spectrum* 39, no. 2 (2017): 179.

¹⁸ See research cited in Justin London, *Hearing in Time: Psychological Aspects of Musical Meter*, 2nd ed. (New York; Oxford: Oxford University Press, 2012), 67.

¹⁹ "Musical Meter, Social Cognition, and Musical Expression: An Inquiry in Cognitive Aesthetics," in *Musical Implications: Essays in Honor of Eugene Narmour*, ed. Lawrence F. Bernstein and Alexander Rozin (Stuyvesant, NY: Pendragon Press, 2013), 285. Emphasis original.

For the type of jarring listening experience represented in Example 1.1a I develop the term *Motive-Directed Meter*, or “MDM.”²⁰ This psychological phenomenon, and the musical passages that give rise to it, form the core subject matter of this dissertation.²¹ The term encapsulates the tension described above, wherein listeners, guided by musical motives, are encouraged to abandon metric hierarchies as they are in the process of becoming.²² MDM therefore arises *only* under a parallelistic strategy. Excerpts of music able to evoke this metric phenomenon are found throughout numerous twentieth and twenty-first century repertoires, from modernist Western art musics to math rock and technical death metal. Although MDM appears with great stylistic diversity, the music of Igor Stravinsky looms large in the development of this repertoire; the composer’s “Russian period” works such as the *Rite of Spring* (1913) and the *Nightingale* (1914) deployed frequently changing metric structures on a scale generally unprecedented at the time of their premieres.²³ Because of the close association of Stravinsky with these techniques, the composer’s more metrically complex works form the primary material of chapters 2 and 3. Chapter 2 introduces several analytic techniques designed to describe

²⁰ Note that the experience depicted in Example 1.1b is *not* an example of MDM, since inertia is privileged.

²¹ A thorough definition of MDM is given in Part III of this chapter.

²² As a historical precedent, consider the eighteenth-century phenomenon of *Imbroglia*, which, as described by Danuta Mirka, utilized motivic parallelism as a means for effecting metric change. The changes were, of course, much more infrequent than in the Missy Mazzoli example described above. Danuta Mirka, *Metric Manipulations in Haydn and Mozart: Chamber Music for Strings, 1787-1791* (Oxford; New York: Oxford University Press, 2009), 133-51.

²³ The use of frequently changing time signatures certainly predated Stravinsky’s early ballets, though the structure of these early works often failed to produce the aural effect of changing meter to the same extent as Stravinsky’s music. See, for example Percy Grainger’s early experiments with so-called “beatless music,” as in his *Hill Song No. 1* (1901-02; rev. 1921-23) and *Sea Song* (1907; rev. 1922 and 1946). See Thomas C. Slattery, “Music for Wind Instruments,” in *The Percy Grainger Companion*, ed. Lewis Foreman (London: Thames, 1981). See also Ivar C. Dorum, “Grainger’s ‘Free-Music,’” *ibid.*

Stravinsky's MDM and applies these techniques to a number of brief excerpts; Chapter 3 then uses this analytic toolkit to study three of Stravinsky's large-scale MDM works.

Composers such as Béla Bartók and Olivier Messiaen were directly inspired by Stravinsky's metric structures and responded to them with developments of their own, extending the repertoire of MDM techniques.²⁴ Such structures were also taken up by composers now associated with minimalism and post-minimalism and have, in recent decades, inspired diverse popular music styles. Chapter 4 of this dissertation details the broad stylistic applicability of the systems used in chapters 2 and 3 to analyze Stravinsky's music, demonstrating that the methods developed here may be fruitfully used to shine light on stylistically and culturally diverse musics, thereby highlighting the significance of MDM as a phenomenon with relevance far beyond the early twentieth-century context with which it is commonly associated.

Motive-Directed Meter stands out as a vital phenomenon worthy of investigation because of its broad stylistic relevancy and, crucially, because of the productive idiosyncrasies of this listening experience. The present analytic project is concerned first and foremost with meter as a psychological phenomenon that exists in the mind and body of the listener, and with MDM as a singular metric configuration that presents challenges and opportunities to the individual in fully unique ways not offered by other extant forms of temporal organization. Given this orientation, the present chapter undertakes a set of interrelated goals. After detailing the experiential view of musical meter used throughout this dissertation, Part II problematizes the relationship between MDM and Western metric theory, using this tension as an opportunity to deconstruct and reframe extant definitions of meter. I introduce a new flexible model of "metric music" with permeable boundaries, allowing us to compare,

²⁴ See David E. Schneider, *Bartók, Hungary, and the Renewal of Tradition: Case Studies in the Intersection of Modernity and Nationality* (Berkeley: University of California Press, 2006), 119-83. See also Vincent P. Benitez, "Stravinsky and the End of Musical Time: Messiaen's Analysis of *the Rite* and Its Impact on Twentieth-Century Music," in *Sacre Celebration: Revisiting, Reflecting, Revisioning* (York University, Toronto, 2013).

contrast, and analyze diverse repertoires that have traditionally sat at the margins of metric theory. Then, in Part III, I present a full definition of Motive-Directed Meter and situate the phenomenon within the context of the new flexible metric model. This theoretical work sets the stage for Chapter 2, which introduces a set of experientially-oriented tools designed to describe the mechanics of the MDM listening experience.

Approaching musical meter as a psychological phenomenon rather than something occurring “in the music,” it should come as no surprise that this dissertation is full of discussions about the listener. Of course, there is no single listener, nor any “ideal” listener whose experience is worthy of greater attention than any other.²⁵ Rather, there are a truly infinite number of listeners, each enculturated in fully unique ways and each possessing their own preferences and idiosyncratic listening habits. Not only is every individual different but, as environments and attentional levels can never be exactly reproduced, all encounters with a piece of music are distinct from one another. For these reasons, the analyses in this dissertation will posit hypothetical listeners whose characteristics and preferences are defined. These listeners are in most cases intended to be as plausible as possible; that is, I am concerned with probable listening experiences rather than the introduction of listening technologies designed to generate new encounters. In many cases, this means exploring the same piece of music from a number of different angles so as to highlight that, for example, *if* a listener hears a passage according to X, Y will result; if, instead, they hear it according to A, B will emerge instead. The determination of plausibility is the most difficult part of this process; such judgements will be made relative to a particular set of views regarding the behaviors of listeners and the mechanics of the listening experience, laid out in Chapter 2.

Although the analyses in this project model the experience of the listener, they also have relevance for the performer and conductor. Performing musicians approach their music with different

²⁵ Neither am I seeking to model my own approach as a listener myself, though I am necessarily guided by my own musical instincts throughout and will not attempt to pose as a neutral arbiter.

sets of skill and knowledge than a general audience, but like so-called “passive” listeners—who are not truly passive at all, but active creators of their own metric experiences—performers must entrain the music they are performing and correctly predict the arrival of oncoming musical events—indeed, the stakes are much higher for inaccurate predictions! Some of the analytic techniques introduced in Chapter 2 are designed to model only a first-time hearing, in which a listener works to understand unfamiliar music; these are less relevant for the performing musician. Nevertheless, just like listeners, as actively entraining participants, performers—including conductors—experience the same tensions between parallelism and inertia, despite the aid of memory and/or notation to guide their metric expectations.

Musics that elicit the experience of Motive-Directed Meter have received some scholarly attention, primarily within the realm of Stravinsky scholarship. Yet few authors have elected to grapple with the phenomenon as such, opting instead to focus on the structural complexities of the music that evokes it. Pierre Boulez, for example, performed rhythmic analysis of several sections of the *Rite of Spring* using a labeling convention that combines motive letter names with Arabic numerals that indicate length in terms of number of unit pulse onsets, as shown in Example 1.2.²⁶ The notation system is informative—and inspires my own developed in Chapter 2—but Boulez’s resultant analyses are limited. His approach is a structuralist search for patterns, which he uncovers from a bird’s-eye view; that is, he surveys the score from an atemporal perspective, finds connections between motive statements, and diagrams them. At no point is there consideration for the temporal experience of these patterns, nor even of whether it is plausible that these patterns would be perceived by a listener. Rather, this is a fundamentally poietic exercise about Stravinsky’s intentions and compositional process. Boulez’s method was doubtless inspired by his teacher Olivier Messiaen, who analyzed the *Rite*

²⁶ Pierre Boulez, *Notes of an Apprenticeship*, trans. Herbert Weinstock (New York: Alfred A. Knopf, 1968), 98.

extensively in his *Technique of my Musical Language* using a similar structuralist approach, and taught its metric organization to his students at the Conservatoire.²⁷

The image shows a musical score with Boulez's schematic analysis. The score is written for two staves (treble and bass clef) in 3/8 time. The analysis is divided into five sections: A I, A II, A III, A IV, and A V. Section A I is labeled 'order A' and contains two measures of music. Section A II is labeled 'a elided', 'b', 'b augmented', and 'c termination'. Section A III is labeled 'varied' and contains four measures of music, with the first two measures labeled 'twice 3' and the last two 'thrice 2'. Section A IV is labeled 'the A groups encompass the B groups' and contains two measures of music, with the first labeled 'twice 3' and the second 'twice 3'. Section A V is labeled 'idem.' and contains two measures of music, with the first labeled 'thrice 2' and the second 'thrice 2'. The analysis also includes various rhythmic notations such as 'B₃', 'B₂', 'B₆', and 'B₄'.

Example 1.2. Boulez' schematic analysis of a portion of the "Ritual of Abduction" from Stravinsky's *Rite of Spring* (Example VIII; Boulez, 1968)

More recent scholarship has come closer to addressing the experiential component of this music. Pieter van den Toorn has written extensively about both the pitch and rhythmic dimensions of Stravinsky's music, inventing a typology of the composer's more metrically complex passages that labels them as instances of one of two types of metric organization. In Type 1, two or more separate "blocks" of musical material alternate, frequently featuring changing meter signatures as the blocks expand and contract. This is opposed to Type 2, wherein multiple different parts occur simultaneously, creating a complex polyphonic texture.²⁸ Type 1 suggests a parallelistic strategy, while Type 2 encourages

²⁷ See Olivier Messiaen, *Technique of My Musical Language* [Technique de mon langage musical], trans. John Satterfield (Paris: A. Leduc, 1956). See also Benitez, "Stravinsky and the End of Musical Time: Messiaen's Analysis of *the Rite* and Its Impact on Twentieth-Century Music."

²⁸ van den Toorn, *Stravinsky and the Rite of Spring: The Beginnings of a Musical Language*, 99-100.

attending to inertia. Although Type 1, with its prominent recurrent motivic blocks, is fully able to elicit Motive-Directed Meter, van den Toorn does not prioritize this experiential dimension, focusing instead on uncovering structural patterns in the music, like Boulez and Messiaen before him. When he does attend to meter as a heard phenomenon, van den Toorn downplays the significance of the metric irregularities in Type 1 structures by normalizing them relative to a “background periodicity” against which metric changes may be heard and with which they ultimately re-align.²⁹ Although intended as a perceptual phenomenon, in which the listener may attend to these consistent periodicities rather than adjusting to the meter of each new “block” as it occurs, I find van den Toorn’s proposed normalizations implausible. Rather than suggesting likely listening approaches, it seems to me that van den Toorn is advancing a listening technology that frees the listener from difficult metric reorientations; this periodicity-privileging approach cannot give rise to Motive-Directed Meter, which necessitates direct confrontation with non-periodicity as it actually appears on the musical surface.

Gretchen Horlacher has undertaken a more listener-oriented approach to the analysis of metric irregularity in Stravinsky’s music, introducing a set of symbols designed explicitly to capture aspects of the listening experience. This includes circled dots under certain metric events designed to identify moments of mismatch between expectation and realization, events that then result in expectational changes.³⁰ Horlacher describes meter as a fundamentally variable, temporal experience; this is a significant step that allows modeling of the interaction between listener and music, highlighting how expectations evolve over time in dialogue with the success (or failure) of past predictions. John Roeder has also analyzed musics able to give rise to MDM, with a focus on the music of Béla Bartók. Like

²⁹ *The Music of Igor Stravinsky* (New Haven: Yale University Press, 1983), 218.

Peninah Kanovsky argues for a similar approach to normalizing Stravinsky’s shifting rhythms; see Peninah Kanovsky, “Metric Hierarchy in Music by Bartók, Copland and Stravinsky” (The City University of New York, 2002).

³⁰ Gretchen Horlacher, “Metric Irregularity in “Les Noces”: The Problem of Periodicity,” *Journal of Music Theory* 39, no. 2 (1995): 300.

Horlacher, Roeder is concerned with the listener's experience of these musics, though his approach is unique. Building upon his "pulse stream" technology first introduced in the context of the music of Arnold Schoenberg, Roeder explores how individual pulses rise to the fore during the listening experience, presenting a model which "represents rhythmic polyphony as two or more concurrent 'pulse streams' created by regularly recurring accents. These pulse streams are considered to be distinct continuities, not 'levels' or groupings of each other, so this approach does not involve meter in the exclusive and hierarchical senses..."³¹ His analytic method revolves around locating those musical features which give rise to certain pulses, which may be in conflict with each other, and attending to how they enter into, and fade away from, perceptual availability over the course of a given passage. Although Roeder does attend to the interaction between pulse and periodicity, his approach is, like van den Toorn's, fundamentally inertial in its design.³² Pulse streams are in essence a more flexible form of "background periodicity" in which the listener is assumed to privilege regularity above all else.

Since Motive-Directed Meter arises only under a parallelistic listening strategy, these inertially-oriented analytic methods cannot account for the MDM listening experience. Parallelism and inertia are not equally matched when attending to these repertoires; yet even when parallelism tends to rise to the fore, inertia does not therefore become irrelevant. Though a listener may gravitate towards parallelism, the fundamental tension with inertia remains in effect; in other words, the psychological preference for periodicity does not simply disappear because a listener adjusts their position relative to a new orienting downbeat. Van den Toorn notes that "these forces are still apt to be felt in relation to one another... The one presupposes the other, in other words, as part of a dialectic."³³ Indeed, MDM is difficult and

³¹ John Roeder, "Interacting Pulse Streams in Schoenberg's Atonal Polyphony," *Music Theory Spectrum* 16, no. 2 (1994): 232-33.

³² Roeder notes that pulses will persist for some time even when not reactivated. *Ibid.*, 234.

³³ van den Toorn, "The Rite of Spring Briefly Revisited: Thoughts on Stravinsky's Stratifications, the Psychology of Meter, and African Polyrhythm," 179.

tension-filled specifically because, while pursuing parallelism, the pull of inertia necessarily continues to be felt. These two forces are united by the principle of cognitive economy: simply put, it is more efficient to maintain an entrained metric pattern than to constantly readjust in the face of new information. Similarly, it is more efficient to hear a musical motive in the same metric context in which it is expected. Assuming that listeners tend, however subconsciously, to pursue the path of least resistance, I argue that, in musics that facilitate MDM, the easier path is generally the parallelistic. Nevertheless, there will be listeners that gravitate towards inertial hearings such as that given in Example 1.1b. Such strategies are much more akin to traditional metric experiences, and are therefore not discussed in detail in this project.

Having now considered the basic experiential features of Motive-Directed Meter and the work of the few scholars who have treated related topics, we turn to explore how the phenomenon fits within theories of meter conceived more broadly, and how MDM can inform our understanding of musical meter in general. I then return to define MDM in more explicit detail in Part III. Throughout the following discussion it will be crucial to maintain a clear conceptual distinction between meter as a subjective phenomenon and the structure of pieces of music that give rise to it. Any observations regarding “the meter” of a piece of music are necessarily observations about structural features that enable certain metric *experiences*. Pieces of music cannot themselves possess or express Motive-Directed Meter; rather, they merely facilitate its coming into being.

II. TOWARDS A FLEXIBLE CONCEPTION OF METRIC ORGANIZATION

Centuries of Western music theory have reinscribed one essential message about meter: it is fundamentally regular and periodic in nature, in contrast to the flexible, relatively unrestricted organization of musical rhythm. For William Caplin, this binary conception dates back the Eighteenth Century, to “Kirnberger and his circle [who] laid the aesthetic basis for a fundamental dichotomy, which

has persisted today, between rhythm, as unconstrained durational patterning, and meter, as rigid accentual hierarchy.”³⁴ Although some theorists have pushed back against such dichotomous thinking, the division remains evident in current scholarship.³⁵ This presents a clear problem for Motive-Directed Meter, rooted as it is by definition in aperiodic durational spans. Analysts have recognized this tension, and have generally taken one of two approaches in attempt to create a resolution.

Justin London, summarizing the work of scholars of music perception, notes that “Meter is a musically particular form of *entrainment* or *attunement*, a synchronization of some aspect of our biological activity with regularly recurring events in the environment.”³⁶ This act of synchronization occurs in two stages: first, in the brief *abstraction phase*, the listener attends to the musical signal, ascertains its durational patterning, and achieves synchronization with recurrent periodicities. Then, in the *generation phase*, the listener simply maintains and continually re-generates, with the aid of inertia, that state of synchrony, expending little energy in order to do so, except in cases of notable syncopational complexity or metric dissonance.³⁷ For London, musical meter is this second state of stable, entrained listening. Yet Motive-Directed Meter effects metric reorientation with such frequency

³⁴ William E. Caplin, "Theories of Musical Rhythm in the Eighteenth and Nineteenth Centuries," in *The Cambridge History of Western Music Theory*, ed. Thomas Christensen (New York: Cambridge University Press, 2001), 668.

³⁵ For a nuanced critique of this binary distinction rooted in Moritz Hauptmann’s experiential approach, and a model of musical meter which rejects the distinction between rhythm and meter, see Christopher Francis Hasty, *Meter as Rhythm* (New York: Oxford University Press, 1997).

³⁶ London, *Hearing in Time*, 4.

³⁷ Jones, "Learning and the Development of Expectancies: An Interactionist Approach," 193. Justin London has termed these two stages *recognition* and *continuation*. London, *Hearing in Time*, 67. Fitch and Rosenfeld demonstrated, for example, that higher degrees of syncopational complexity resulted in less strong encoding; see Tecumseh W. Fitch and Andrew J. Rosenfeld, "Perception and Production of Syncopated Rhythms," *Music Perception* 25, no. 1 (2007). For more on metric dissonance, see Harald Krebs, *Fantasy Pieces: Metrical Dissonance in the Music of Robert Schumann* (New York: Oxford University Press, 1999). See also Richard Cohn, "Complex Hemiolas, Ski-Hill Graphs and Metric Spaces," *Music Analysis* 20, no. 3 (2001).

that a listener rarely, if ever, enters into that stable expectation generation phase. When changes occur with every new motive statement—as they do, for example, with only two exceptions in the passage from Mazzoli’s *Song from the Uproar* shown in Example 1.1a—the listener rarely, if ever, achieves synchrony, and generation is not possible. It would seem, then, that an individual thusly trapped in the abstraction phase is not listening metrically and, as a result, such music cannot be considered to be metric in nature. Indeed, London has suggested that the “aesthetic failure” of portions of Stravinsky’s *Les Noces* are attributable to the frequent metric changes which, he claims, inhibit “collective social experience” by undermining the entrainment of “larger-scale periodicities.”³⁸

Gretchen Horlacher presents a different solution to this tension between periodic meter and aperiodic MDM. Analyzing some of the same irregular *Les Noces* passages as London—reproduced in part here as Example 1.3—Horlacher expresses her reticence to accept a model of meter that excludes Stravinsky’s music, which, she argues, does still continue to evoke the feeling of meter even in the absence of the kinds of periodicities we typically expect in metric music.³⁹ Instead, she chooses to “investigate the problem of defining meter as strictly periodic at the levels of the measure and the beat,” suggesting that, although “most theorists...require periodicity at the level of the beat (or tactus), corresponding with a steady pulse, and at the level of the measure, corresponding with a single time-signature designation,” meter can exist even in aperiodic contexts.⁴⁰ Horlacher’s approach is a redefinition of meter itself:

Under certain conditions, I believe we may predict or expect an “irregularity” to occur and, in doing so, reinterpret its usual or atypical features as normative with respect to the piece. In

³⁸ London, “Musical Meter, Social Cognition, and Musical Expression: An Inquiry in Cognitive Aesthetics,” 277.

³⁹ Horlacher, “Metric Irregularity in “*Les Noces*”: The Problem of Periodicity,” 289-90.

⁴⁰ *Ibid.*, 290.

other words, I will argue for a kind of meter which is not shackled to periodicity, and which allows aperiodic material to assume a fundamental rather than derivative role.⁴¹

If aperiodicity is elevated to the status of “metric,” Horlacher’s fears about a definition of meter that would exclude Stravinsky are alleviated.



Example 1.3. Passages from Stravinsky’s Les Noces that have proven problematic for Horlacher and London (Example 3; Horlacher, 1995)

Yet neither of these solutions is wholly satisfactory. I share Horlacher’s concerns about more restrictive definitions such as London’s, and, like her, find myself engaged in some sort of metric experience in response to Stravinsky’s music. Yet elevation of aperiodicity to a central position alongside periodicity within a model of musical meter, wherein the latter has maintained unquestioned priority for

⁴¹ Ibid.

centuries, seems drastic. In other words: London defines a conceptual core of meter that leaves MDM and many other types of temporal organization out in the cold; Horlacher instead expands that same conceptual core so as to include them. Yet if, as I contend, periodicity is fundamentally more “metric” than non-periodicity, no binary “either-or” system will suffice. What we need instead is a flexible model of musical meter that includes aperiodicity while still recognizing the relative primacy of the periodic.

The question of whether a given repertoire is accorded the status of “metric music” has significant implications for the kinds of questions we (are able to) ask about it. Recognizing that certain metrically atypical musics nevertheless share a set of common features with more typical exemplars, it becomes clear that, approaching the atypical, we need not start over from scratch. Rather, acknowledging and specifying shared commonalities will allow us to productively apply the tools designed for normatively metric musics to shine light on the less normative. A dichotomous distinction limits communication between and about pieces of music by creating a *de facto* condition of difference, discouraging analysts from comparing pieces across that binary divide.⁴² Yet it’s my contention that music at the margins of the concept can help us to refine our understanding of musics at the center; Motive-Directed Meter does exactly this by urging us to ask how our definition of meter—and at least some of the tools developed to analyze metric musics—can best accommodate the non-standard structures that give rise to it.

I argue that the fundamental problem here is one of categorization; that Western theorists, while treating “metric music” as flexible in practice, have tended to put forth formal definitions that delineate strict boundaries for membership in that category. Eleanor Rosch has suggested that this

⁴² Why not, in place of a metric/non-metric binary, effect instead a multiplicity of categories, such as “metric,” “pulsed,” “semi-pulsed,” and so forth? As I argue in my flexible definition of meter below, each of the definitional features is itself a spectrum, such that creating firm divisions at any point requires arbitrary distinctions. Yet ultimately, I treat “meter” as a kind of parent category, within which there is room for infinite finer distinctions, as seen in the discussion of the multi-dimensional metric space below.

tendency towards rigid definitions is an Aristotelian legacy in Western thought. “When describing categories analytically,” she writes, “most traditions of thought have treated category membership as a digital, all-or-none phenomenon. That is, much work in philosophy, psychology, linguistics, and anthropology assumes that categories are logical bounded entities, membership in which is defined by an item’s possession of a simple set of critical features, in which all instances possessing the criterial attributes have a full and equal degree of membership.”⁴³ In contradistinction to this tendency, Rosch examines the structure of so-called “natural categories,” which exhibit flexible definitions and gradations of category membership. Some of these natural categories revolve around prototypical exemplars, such as colors:

There is now considerable evidence that color categories are processed by the human mind...in terms of their internal structure: color categories appear to be represented in cognition not as a set of criterial features with clear-cut boundaries but rather in terms of a prototype (the clearest cases, best examples) of the category, surrounded by other colors of decreasing similarity to the prototype and of decreasing degree of membership.⁴⁴

Within the category “red,” for example, crimson is a more prototypical representative than cerise or burgundy. Applying Rosch’s distinction to music analysis, Lawrence Zbikowski notes that traditional “classical” categories, in which members must possess certain necessary and sufficient traits, are not flexible enough to describe the complexities inherent in ascriptions of identity and similarity of musical motives.⁴⁵ Rather, such objects exhibit the tendencies of natural categories, in which membership is “not fixed, but is instead graded through a dynamic process in which the attributes of potential category

⁴³ Eleanor Rosch and Carolyn B. Mervis, “Family Resemblances: Studies in the Internal Structure of Categories,” *Cognitive Psychology* 7 (1975): 573-74.

⁴⁴ Eleanor Rosch, “Cognitive Representations of Semantic Categories,” *Journal of Experimental Psychology: General* 104, no. 3 (1975): 193.

⁴⁵ Lawrence M. Zbikowski, *Conceptualizing Music: Cognitive Structure, Theory, and Analysis* (Oxford; New York: Oxford University Press, 2002), 40.

members are compared with the attributes most typically found within that category.”⁴⁶ I contend that, operationally, musicians and theorists alike treat the “metric” as a natural category, all the while putting forth formal definitions more often in line with the principles of classical categorization.

Categorization serves a number of crucial purposes for our processing of the world. “From an information-theory perspective,” write Goldstone and Kersten, “storing a category in memory rather than a complete description of an individual is efficient because fewer bits of information are required to specify the category.”⁴⁷ In this way, categorization serves to conserve memory; yet this benefit must be counterbalanced by sufficient specificity to enable accurate predictions. If a category is too vague, although highly economical in terms of resources, it will not provide enough detail to allow a person to respond adequately to threats in the environment. Natural categories enable us to make inductive predictions about the world we inhabit; effective categorization therefore threads a delicate balance between efficiency of information storage and effectiveness of predictive potential.⁴⁸ It should be noted that I am not making claims here about how the concept of meter is actually represented in the mind; rather, the issue of the categorization of “the metric” is fundamentally a matter of conceptualization. If, as I’ve suggested, the concept is deployed flexibly in practice, our theoretical models ought to match this reality; and, as the following flexible description will illustrate, a matching theoretical model will enable more effective application of analytic tools designed for typically metric musics.

Natural categories are frequently associated with *prototypes*, individual category members who exhibit the central tendencies of the category and against which other entities are compared to assess degree of membership, as in the example of color categorization discussed above. Yet, as Rosch notes, such prototypes are only found in specific artificial categories; much more common in natural categories

⁴⁶ Ibid., 37.

⁴⁷ Robert L. Goldstone and Alan Kersten, “Concepts and Categorization,” in *Handbook of Psychology*, ed. Alice F. Healy and Robert W. Proctor (John Wiley & Sons, Inc., 2003), 603.

⁴⁸ Ibid., 602.

are structures revolving around a set of specific prototypical features without a single literal prototype exemplar representing them.⁴⁹ Palmer describes these central tendencies of a category in terms of *feature lists*, which encapsulate the primary properties of the category used to assess degree of membership without depending on a literal specific instance to stand in as the basis for comparison.⁵⁰ I argue that musical meter functions in precisely this way; that “metric” evokes a set of interrelated features without necessarily depending on specific instances—that is, pieces of actual music—in order to achieve a conception of the category. In what follows, I put forth a definition of musical meter as a natural category, isolating and defining it along a feature list of four distinct properties: *timepoint specificity*, *pulse periodicity*, *hierarchic depth*, and *motivic saturation*.⁵¹

As stated in the introduction, meter is a psychological process defined by bodily synchronization and temporal orientation. Each of the following four features of this flexible definition are directly relevant to such orientation. The features are expressed as continua, each of which is capable of expressing an infinite number of possible values; yet crucially, these continua are not neutral with regard to metric prototypicality. Rather, specific tendencies within each continuum support temporal

⁴⁹ Eleanor Rosch, "Principles of Categorization," in *Concepts: Core Readings*, ed. Eric Margolis and Stephen Laurence (Cambridge, MA: MIT Press, 1978).

⁵⁰ Stephen. E. Palmer, "Fundamental Aspects of Cognitive Representation," in *Cognition and Categorization*, ed. Eleanor Rosch and Barbara B. Lloyds (Hillsdale, NJ: Lawrence Erlbaum Associates, Inc., 1978), 281-85.

⁵¹ There are certainly other contenders for the feature list, though they are less relevant to the particular issues surrounding Motive-Directed Meter. Possibilities include, amongst others, syncopational complexity, tempo, and duple versus triple pulse relations. Syncopational complexity may be the best contender, but it varies widely by genre and is therefore difficult to pin down. Maria Witek et al. found that moderate levels of syncopation best facilitated bodily engagement; these findings may hold significance for the role of syncopation in prototypical metricality. See Maria A. G. Witek et al., "Syncopation, Body-Movement and Pleasure in Groove Music," *PLoS ONE* 9, no. 4 (2014). Eytan Agmon has previously applied prototype theory to the domain of musical harmony. See Eytan Agmon, "Functional Harmony Revisited: A Prototype-Theoretic Approach," *Music Theory Spectrum* 17, no. 2 (1995).

orientation to a greater or lesser extent. Indeed, relative facilitation of temporal orientation is the only criterion by which the relative prototypicality of feature tendencies will be determined.

Timepoint Specificity

My definition of meter is based closely upon that offered by Richard Cohn, in which meter is conceived of as a set of concurrently-sounding pulses, each of which comprises a set of sequential timepoints.⁵²

Cohn notates this abstract set of sets with a diagram of individual dots, or “points,” as reproduced here in Example 1.4. I will refer to such depictions as “timepoint hierarchies” or, more simply, as the “metric hierarchies” they serve to represent. Cohn describes the timepoint in this way:

Points in time, as in space, lack individuating properties, are undefinable and indivisible, and lack extension: they begin and end “at the same time.” Thus no time point is larger or longer than any other. But musical events, such as sounding tones, do have extension. They begin and end at distinct time points, which bound a continuous span of time that has a measurable duration.

Points and spans stand in dual relation. A pair of time points specifies a unique continuous span; conversely, that span is bounded only by that pair of time points.⁵³

Theoretically, the timepoint is a truly instantaneous event that has no duration whatsoever; the entirety of musical time therefore occurs within the spans that separate these distinct points. This is a strict distinction between point and span that allows for no blurring between them. Although the division is clear, and may well be how many musicians, composers, and theorists understand these structures, musical practice departs from such an abstract distinction. Recent work on microtiming or “participatory discrepancies” has demonstrated that there is a flexible range of time in which musical events actually occur though typically notated and conceived of as happening simultaneously.⁵⁴ Anne Danielsen has

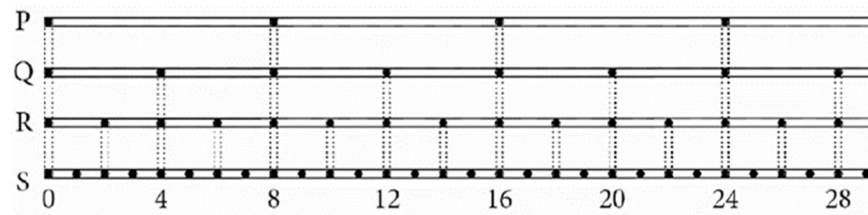
⁵² Cohn, “Meter,” 210.

⁵³ Ibid.

⁵⁴ Seminal works on the topic include Charles Keil, “Participatory Discrepancies and the Power of Music,” *Cultural Anthropology* 2, no. 3 (1987).

See also “The Theory of Participatory Discrepancies: A Progress Report,” *Ethnomusicology* 39, no. 1 (1995).

proposed the term “beat bin” to refer to this range of time around the theoretical time point in which the listener is able to “quantize” any onset event.⁵⁵

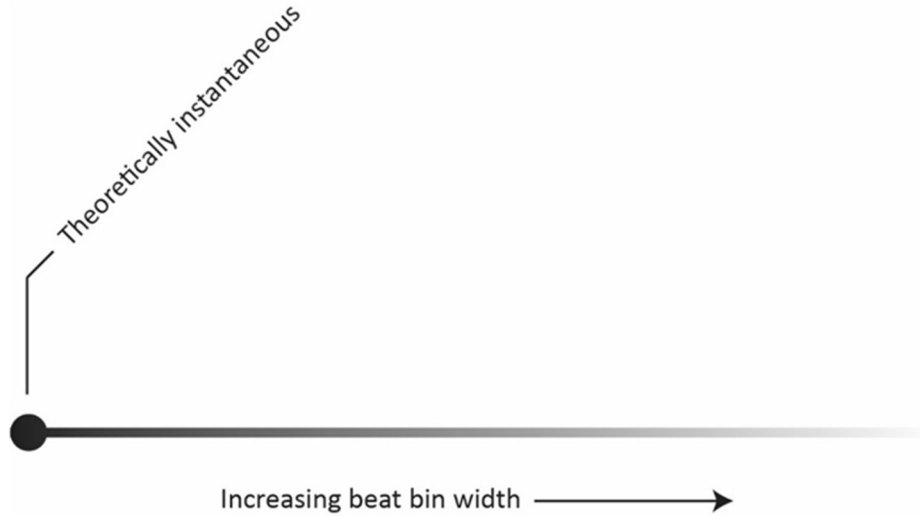


Example 1.4. The timepoint hierarchy of a pure duple meter (Figure 9.1; Cohn, 2020)

Given the inherent variability of the timepoint, we can best represent this construct as the fluid continuum given in Example 1.5. At one end of this image, we find the state of hypothetical mathematical precision; as one departs from this notional condition, the amount of time around this point expands. The timepoint, by accruing duration, therefore ceases to be a point and becomes itself a span—or rather, it blurs the distinction between point and span presented by Cohn, maintaining the binary conceptually while problematizing it in practice. A division between “the event” and “the space between events” remains evident, but the exact location of that distinction is no longer readily identifiable. Again, the space of this continuum is not equally weighted with regard to prototypical metricality; mathematical precision, enabling perfect onset prediction, provides the most accurate orientation, and therefore represents the state of prototypical meter. Movement away from this end represents decreasing levels of prototypicality until, at a certain point, the bin has become so wide that it is no longer recognizable as such, but “splits” into multiple distinct onset events at demonstrably different timepoints.

⁵⁵ Anne Danielsen, "Here, There, and Everywhere: Three Accounts of Pulse in D'angelo's 'Left and Right'," in *Musical Rhythm in the Age of Digital Reproduction*, ed. Anne Danielsen (Burlington, VT: Ashgate, 2010), 29.

For more on quantization, see Ingmar Bengtsson and Alf Gabrielsson, "Analysis and Synthesis of Musical Rhythm" (paper presented at the Studies of Music Performance, Stockholm, 1983).



Example 1.5. The timepoint prototypicality continuum

Pulse Periodicity

Timepoints exist in isolation in the abstract only. Given the sequential nature of musical time, they necessarily stand in temporal relation to one another; each is understood within the context of the memory of those that preceded it and the expectation of those that will follow. Such a series of successive timepoints comprises a *pulse*. Within the tradition of Western music theory, pulses have traditionally been understood to consist of equally-spaced timepoints; that is, they are defined as *periodic* or *isochronous*. For eighteenth century theorist Johann Kirnberger, periodicity was paramount:

Meter actually consists of the precise uniformity of accents that are given to a few notes and of the completely regular distribution of long and short syllables. That is, when these heavier or lighter accents recur at regular intervals, the melody acquires a meter or a measure. If these accents were not distributed regularly, so that no precise periodic recurrence occurred, the melody would be similar only to common prosaic speech; but with this periodic return it is comparable to poetic speech, which has its precise meter.⁵⁶

Similarly, Gottfried Weber described meters of periodicity 5 and 7, which necessarily feature non-periodic pulses that intermingle spans of 2 and 3 timepoints, as fundamentally flawed, suggesting that

⁵⁶ Johann Philipp Kirnberger, *The Art of Strict Musical Composition*, trans. David Beach and Jurgen Thym (New Haven; London: Yale University Press, 1982), 382.

“Such a union of dissimilar elements is unrhythmical; for, the accentuation, in the case of five parts of the measure, cannot possibly be symmetrically divided...”⁵⁷

Lerdahl and Jackendoff initially state a similarly unforgiving distinction, noting, in their Metrical Well-Formedness (MWFR) Rule 4, that all pulses must “consist of equally-spaced beats.” Yet these authors are willing to relax certain aspects of their stricter definition, and do significantly here. First, they account for features such as rubato, which cause a pulse to deviate from perfect mathematical regularity.⁵⁸ They then go one step further:

By keeping MWFR 3 but dropping MWFR 4 we describe a metrical idiom of considerable irregularity, in that strong beats at each level can be indiscriminately two or three beats apart. Such structures appear, for instance, in some of Stravinsky’s music—reflected notationally by his use of constantly changing meters. [...] Certain other metrical idioms have more complex rules in place of MWFR 4, permitting structured alternation of different-length metrical units.⁵⁹

This alteration introduces considerable flexibility into the definition of meter; if beats may be “indiscriminately” two or three beats apart, an infinite number of combinations and patterns born from regular and irregular alternation between these two values become possible. Cohn discusses pulses in a similar sense, defining them as “notionally isochronous time-point sets,” clarifying that “Isochrony is notional because human-generated pulses are elastic.”⁶⁰ He then creates two extensions to this definition of pulse which refine and clarify Lerdahl and Jackendoff’s dropping of MWFR 4: 1) allowing for relations between pulses other than duple and triple; and 2) allowing that pulses that consist of mixed

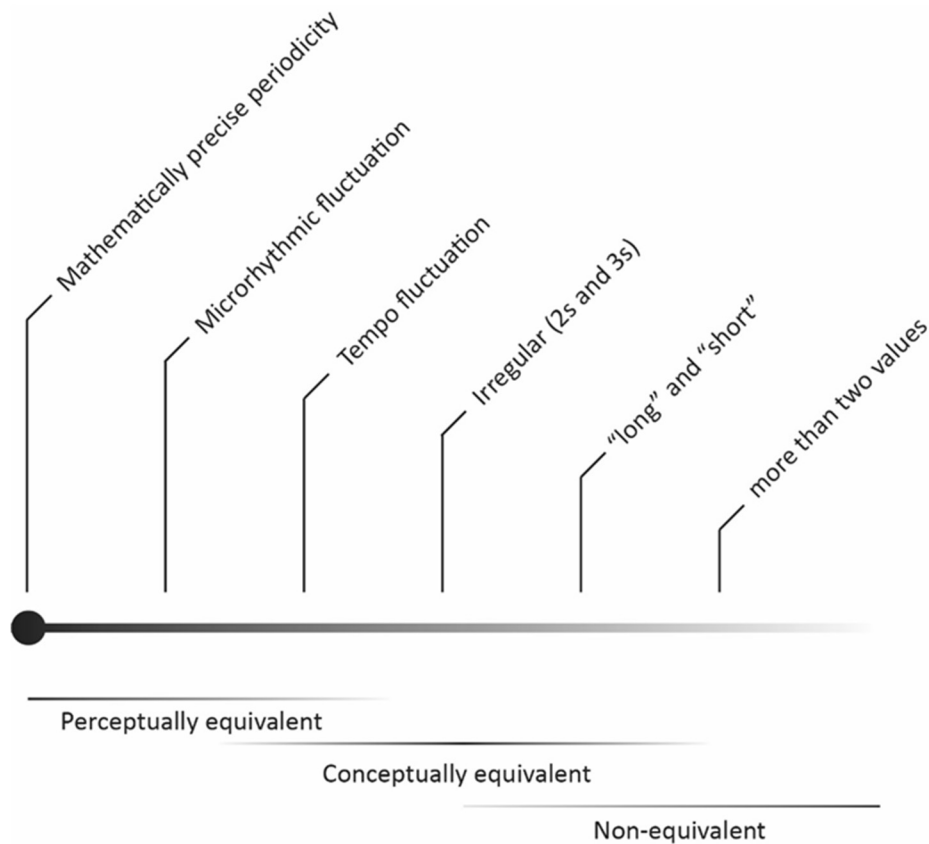
⁵⁷ Gottfried Weber, *The Theory of Musical Composition, Treated with a View to the Naturally Consecutive Arrangement of Topics*, trans. James F. Warner (London: R. Cocks, 1850), 99.

⁵⁸ Lerdahl and Jackendoff, *A Generative Theory of Tonal Music*, 70.

⁵⁹ *Ibid.*, 97.

⁶⁰ Cohn, “Meter,” 211.

segments of duple and triple—such as the (32) or (23) intermediate pulse of a meter notated as 5/4—may still be considered pulses, albeit only “metaphorically.”⁶¹



Example 1.6. The pulse prototypicality continuum

As a result of the sequence in which these definitional components are presented, it appears that these authors are thinking of periodic pulse as the primary default condition on at least a conceptual level. They then permit deviations from that normative state in order to accommodate both performer fluctuations and more structural departures from true isochrony. Such treatment of pulse is fundamentally prototypical in nature, and suggests that this second feature of meter as a natural category, *pulse periodicity*, may be represented as a continuum, as given in Example 1.6. As was the case with the timepoint specificity, one end of this diagram depicts a fixed, abstract condition of

⁶¹ Ibid., 229.

mathematically precise isochrony. Lerdahl and Jackendoff and Cohn alike note that human performers necessarily deviate from such a state, and even digital performers are incapable of mathematically perfect precision; smaller departures from true periodicity may however be fully imperceptible to the human listener.

My continuum is divided into three broad overlapping zones: in the “perceptually equivalent” zone pulses are *perceived* to be equal despite the fact that, at some cognitive level, the listener may be aware of slight deviations, as in the microtiming fluctuations of certain grooves. This is the most prototypical zone, as one can quite easily orient themselves to a pulse that they perceive to be isochronous. Next, in the “conceptually equivalent” zone, the differences among timespans are too great to be perceptually equivalent, and yet they remain *conceptually* equal in some sense—that is, in order to exist “on the same level,”—to comprise the same pulse—the spans separating timepoints must be understood to be *equal enough* to cohabitate that pulse and not be shifted up or down to the next adjacent level.⁶² Conceptually equivalent pulses include non-isochronous pulses that feature combinations of spans 2 and 3 times slower than the adjacent faster pulse, as permitted by Lerdahl and Jackendoff and Cohn. Similarly, London requires that non-isochronous pulses be made up of “shorts” and “longs,” where “shorts” are more than half the span of “longs.”⁶³ Then, in the “non-equivalent” zone, spans within a pulse are no longer even conceptually equivalent. I am not certain that this zone is cognitively tenable; it may be that this sense of conceptual equivalence and the very notion of “pulse” are co-determinate. I nevertheless include this region in order to maintain the flexible graded space of

⁶² Considering a pulse that combines mixed duple and triple spans, we can make an analogy to intervallic categorization. Describing the class of diatonic seconds as equivalent glosses over the distinction between whole and half steps. The two intervals are then equivalent only *conceptually* for trained listeners who know how to distinguish them aurally. 10/9 and a 9/8 whole steps, on the other hand, are *perceptually* equivalent for many listeners who have not learned how to tell them apart, despite being produced by quite different sonic stimuli.

⁶³ London, *Hearing in Time*, 124-29.

this second continuum and avoid drawing an unnecessary final boundary line that may in fact exclude certain musics that can be productively brought under the metric umbrella. In the analyses that comprise chapters 2-4, I will require most non-isochronous pulses to reside in the “conceptually equivalent” zone, disallowing pulses such as (341). This step is analytically motivated and not strictly necessary from a theoretical perspective; indeed, some analysts explore pulses that would reside in my “conceptually equivalent” zone.⁶⁴

Hierarchic Depth

As we’ve seen, just as a pulse is a set of timepoints, so too is meter a set of pulses. According to Cohn’s definition, a meter must have at least two pulses, though there is no theoretical upper limit to their number. Practically there is an upper bound, determined by the limits of human perception and memory, but there is no way to determine a precise location for such a boundary. Furthermore, this limit varies from listener to listener and between listening sessions, and even within a single session, as attention varies and higher levels of the metric hierarchy come in and out of focus.⁶⁵ Yet deeper levels of hierarchy result in the entrainment of longer spans of time, enabling greater predictive control. As Guy Madison has observed, greater hierarchic depth also allows for more accurate synchronization with the musical signal.⁶⁶

⁶⁴ Daphne Leong makes a clear case against such constraints in Daphne Leong, "Generalizing Syncopation: Contour, Duration, and Weight," *Theory and Practice* 36 (2011): 112n5, 18n15. See also her analyses in "Metric Conflict in the First Movement of Bartok's Sonata for Two Pianos and Percussion," *Theory and Practice* 24 (1999).

⁶⁵ Daniel Kahneman discusses the expenditure of effort required in order to pay attention to a given stimulus. I presume here that entrainment to a musical signal requires continual expenditure, a process which may be interrupted by the diverting of attentional energy to competing stimuli. Daniel Kahneman, *Attention and Effort* (Englewood Cliffs, NJ: Prentice-Hall, 1973), 4.

⁶⁶ Guy Madison, "Sensori-Motor Synchronization Variability Decreases as the Number of Metrical Levels in the Stimulus Signal Increases," *Acta Psychologica* 147 (2014).

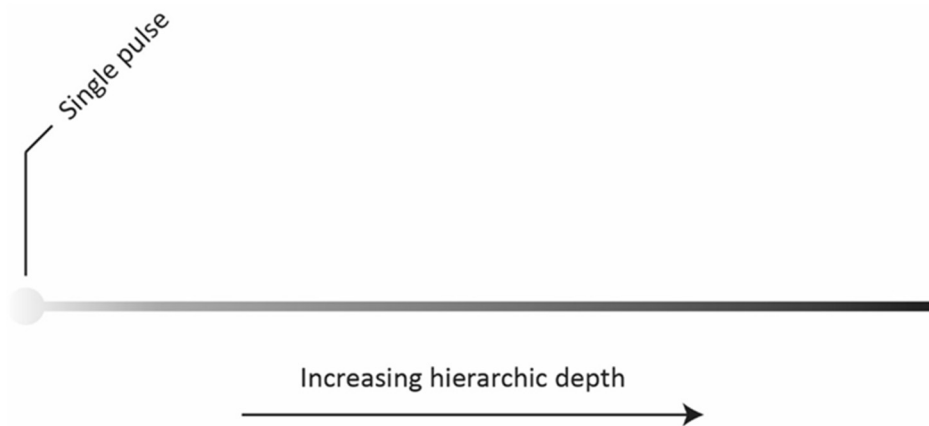
A piece of music may be clearly structured in a hierarchical fashion that unambiguously encourages the entrainment of a hierarchy of pulses. Quite often, however, the slower pulses of the metric hierarchy come into being as a result of *subjective metricization*, the observed phenomenon whereby, presented with a single articulated pulse of identical onset points, listeners will invariably group spans separating those timepoints into sets of 2—or, much less commonly, 3—thereby producing the next-slower pulse.⁶⁷ This process is recursive, such that increasingly slower pulses are generated as long as the patterning of the music facilitates it, up to some unknown perceptual threshold. As long as we are satisfying metric inertia, we are building slower pulse levels, deepening the metric hierarchy until strong musical signals encourage their abandonment.

The continuum representing this third feature of meter is structured somewhat differently than the first two. Prototypical timepoints and pulses stood at the fixed end of the spectrum, which then shaded off into indeterminable degrees of decreasing prototypicality. In the case of *hierarchical depth*, on the other hand, it is the prototypical condition that cannot be fixed numerically. Deep meter is undoubtedly more prototypical than shallow, as it enables predictive control over a greater temporal span, yet there is no single ideal state of maximal depth. Example 1.7 therefore presents a continuum in which the prototypical state resides at the unfixed end. As regards the fixed end, Cohn's minimum of two pulses is logical if we are seeking to locate a boundary between metric and quasi-metric musics, which we might instead call "pulsed" to indicate the flatness of the structure and absence of hierarchical depth.⁶⁸ Yet when approaching meter from the perspective of a natural category, such a distinction is not required; instead, we acknowledge that a shift from a depth of two pulses to one pulse is a decrease

⁶⁷ Renaud Brochard et al., "The "Ticktock" of Our Internal Clock: Direct Brain Evidence of Subjective Accents in Isochronous Sequences," *Psychological Science* 14, no. 4 (2003).

⁶⁸ Michael Tenzer makes similar distinctions in his discussion of contrasting approaches to temporal organization. See Michael Tenzer, "A Cross-Cultural Topography of Musical Time," in *Analytical and Cross-Cultural Studies in World Music*, ed. Michael Tenzer and John Roeder (New York: Oxford University Press, 2011).

of metric prototypicality, though it may not be notably distinct from a similar shift from a depth of three to a depth of two. It seems reasonable, however, to accept that, in order to produce the feeling of meter in any way, at least one pulse—however non-prototypical its structure and the nature of its constituent timepoints—is required, and that subjective metricization dictates that a single pulse cannot exist in isolation for long.



Example 1.7. The hierarchic depth prototypicality continuum

Motivic Saturation

The first three features of this four-feature list concerned the structure of the metric hierarchy itself: first, timepoints, the basic building block; second, pulses, the product of timepoints arranged in succession; and third, the hierarchy that results from the simultaneity of multiple felt pulses. The fourth and final feature is notably different from these in that it concerns not the abstract metric hierarchy against which musical content occurs, but rather the organizational structure of that content itself.

Motivic Saturation describes the extent to which the musical surface is inundated with familiar repeating musical motives. This definition requires some clarification, since “motive” is a term that is frequently used in a commonsense fashion in music scholarship, but rarely explained. As it concerns actual content rather than abstract structure, it is a somewhat more complex matter than the three

features considered so far. Furthermore, since the concept of “motive” is at the very heart of the Motive-Directed Meter itself, the idea merits unpacking.

For Ellis Kohs, a “Musical motive is a short, continuously or frequently recurring musical figure or shape having a distinctive character and a clearly recognizable profile.”⁶⁹ This definition is likely to ring true with the commonsensical understanding of the term; it furthermore captures two crucial components of the concept. First, Kohs underscores the importance of repetition. Elizabeth Margulis has noted how crucial repetition is to the “thingification” of motivic content—that is, it is only as a result of the act of repetition that a musical entity enters perception as a motive in the first place.⁷⁰ Repetition marks the repeated element as important, entering it into memory so that it is more easily recognized upon its next recurrence. This brings us to Kohs’ second important recognition: that motives are ultimately something that occurs in the act of perception, rather than out there in “the music itself”—whatever that might be. Motives must be “distinctive in character” and exhibit a “clearly recognizable profile”—that is, they must be amenable to identification. Elements that are too complex, too simple, too long, or otherwise too resistant to memorization and categorization may not be ultimately understood by the listener as a motive, despite the presence of repetition. Some authors have used more specific terms such as “rhythmic motive” to refer to parameter-specific, less distinctive recurring elements that may or may not enter into conscious perception as motives proper—I will, however, use only the general term “motive,” and will reserve it for elements that have distinctive properties in multiple musical parameters, most crucially in the domains of rhythm and pitch/contour.⁷¹

⁶⁹ Ellis B. Kohs, *Musical Form: Studies in Analysis and Synthesis* (Boston: Houghton Mifflin, 1976), 7.

⁷⁰ Elizabeth Hellmuth Margulis, *On Repeat: How Music Plays the Mind* (Oxford; New York: Oxford University Press, 2014), 39.

⁷¹ Dora Hanninen’s work on Contextual Criteria is also very relevant to any discussion of motivic association. She discusses the identification of repetition and similarity across “one and in multiple dimensions” as vital to associative thinking, noting that “the potential for association between segments prompts their mutual formation. Associations between groupings define segments and imply

In general, motives are typically recognizable as such when repeated exactly. Yet varied repetition is extremely common as well, which raises questions about a listener's ability to recognize motives upon varied recurrences. This aspect of motivic alteration arises in multiple definitions: Wallace Berry, for instance, suggests that "The motive might be defined, then, as the smallest characteristic unit, distinctive in melodic and rhythmic content, whose significance is established in development."⁷² The definition captures Kohs' observation about distinctiveness, as well as the parametric importance of rhythm and melody. But rather than emphasizing *repetition*, Berry refers to *development*, a concept requiring some degree of alteration and transformation in time in order to become actualized. Hugo Leichtentritt is more explicit still about the importance of alterations, noting that a "Motif permits a diversified number of changes in both the melody and the rhythm. In spite of such changes, it will be easy to recognize the motif if the distribution of its notes on the accented and unaccented beats of the measure remain unchanged."⁷³ Leichtentritt mentions the importance of consistent metric patterning on motivic recognition; Part III of this chapter returns to consider this topic in more detail. Like the other definitions we've seen, his definition highlights the rhythmic and melodic parameters, the importance of human perception, and the centrality of varied repetition to the concept of motive. But how much variation is too much? That is, at what point does the level of rhythmic or melodic transformation cause the altered motive to be no longer recognizable as an instance of that motive?

It is in service of this very question that Lawrence Zbikowski adapted Eleanor Rosch's work on natural categories to the domain of music theory, a project that served as the inspiration for my current

boundaries." Dora Hanninen, *A Theory of Music Analysis: On Segmentation and Associative Organization* (Rochester, NY: University of Rochester Press, 2012), 32-33.

⁷² Wallace Berry, *Form in Music: An Examination of Traditional Techniques of Musical Form and Their Applications in Historical and Contemporary Styles*, 2nd ed. (Englewood Cliffs, N.J.: Prentice-Hall, 1986), 4.

⁷³ Hugo Leichtentritt, *Musical Form* (Cambridge: Harvard University Press, 1951), 5.

application of her work to musical meter. Zbikowski notes that every motive is itself a natural category, in which membership must be flexible rather than binary. “Membership in these categories is not fixed,” he notes, “but is instead graded through a dynamic process in which the attributes of potential category members are compared with the attributes most typically found within that category.”⁷⁴ Analyzing several approaches to motivic categorization, Zbikowski demonstrates that Schoenberg’s well-known approach to the motive is consistent with natural category organization. “Our sense that a collection of things coheres as a category reflects the attributes shared by those things. The [motivic] variability Schoenberg noted is analogous to the variation among members of a [natural] category.”⁷⁵

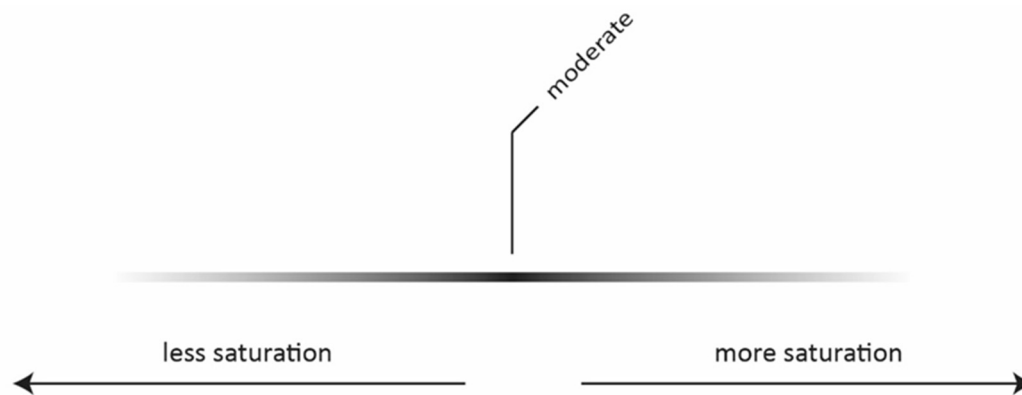
Example 1.8 presents the continuum for this fourth and final feature of meter as a natural category, arranging motivic saturation along a scale from no saturation to complete saturation. As there are no hard limits to possible levels, neither end of the continuum is fixed. A piece of music approaching no saturation would be extremely heterogeneous and lacking repetition of rhythmic or melodic elements; such a piece would be incapable of producing recognizable multi-dimensional musical objects that would rise to the level of “motive” for a listener.⁷⁶ A piece of music residing at the opposite end of the spectrum would instead feature total repetition from beginning to end, such that all musical content would consist of a single continually recurring motive. This is somewhat reductive, as there are other components to consider in addition to degree of repetition, such as the total length of the repeating element, its level of distinctiveness, and the extent and type of the variation to which it is subjected. We will fold all of these elements into this single spectrum, all the while recognizing that Example 1.8

⁷⁴ Zbikowski, *Conceptualizing Music*, 37.

⁷⁵ *Ibid.*, 49.

⁷⁶ In other words, due to a lack of contextual criteria, associative sets would not be readily identifiable. See Hanninen, *A Theory of Music Analysis: On Segmentation and Associative Organization*, 9-13, 20.

represents a simplification and that, although several of these subcomponents may often be co-determinate, they are also fully capable of varying independently of one another.



Example 1.8. The motivive saturation prototypicality continuum

Following the above, we arrive at a four-feature definition of musical meter, as used in this dissertation to describe a felt experience of temporal synchronization and orientation. Prototypical meter arises from the experience of 1) *precise* timepoint specificity; 2) *isochronous* pulses; 3) *deep* hierarchy; and 4) *moderate* levels of motivive saturation. Deviations from these positions in any of these parameters results in a reduction of metric prototypicality—that is, of temporal orientation—and a musical experience that feels “less metric.” Before proceeding further, a few qualifications are in order. First, although this view of meter is designed to be applicable to all of the world’s pulsed musics, it has been designed by a Western listener—myself—as a result of my own listening experiences and in response to Western theories of meter. Therefore this model is able to describe my own metric experience—and presumably that of similarly-enculturated listeners—as it arises in response to all pulsed musics, but it may not be an accurate representation of the experience of all listeners. Thankfully, the model is flexible and able to be emended in order to accommodate different listening practices and preferences. Second, and relatedly, the use of the term “meter” is historically motivated, but essentially arbitrary. By asserting that all the world’s pulsed musics are “metric” to some extent, I mean only that the psychological and physiological responses of entrainment can be elicited by any

pulsed musics, and that temporal orientation results. A different term with less historical and cultural baggage could be substituted for “meter” without any loss in meaning; my usage, however, is compatible with many contemporary scholars who view meter as a psychological phenomenon, as noted above, and it is that dialogue in which I seek to participate. Finally, it should be clear that this flexible model of meter makes no assertions of valuation: more prototypically metric musics are in no way superior to the less prototypical. Indeed, it may be that musically interesting metrical phenomena arise only by departing from the idealized state of prototypical metricality.

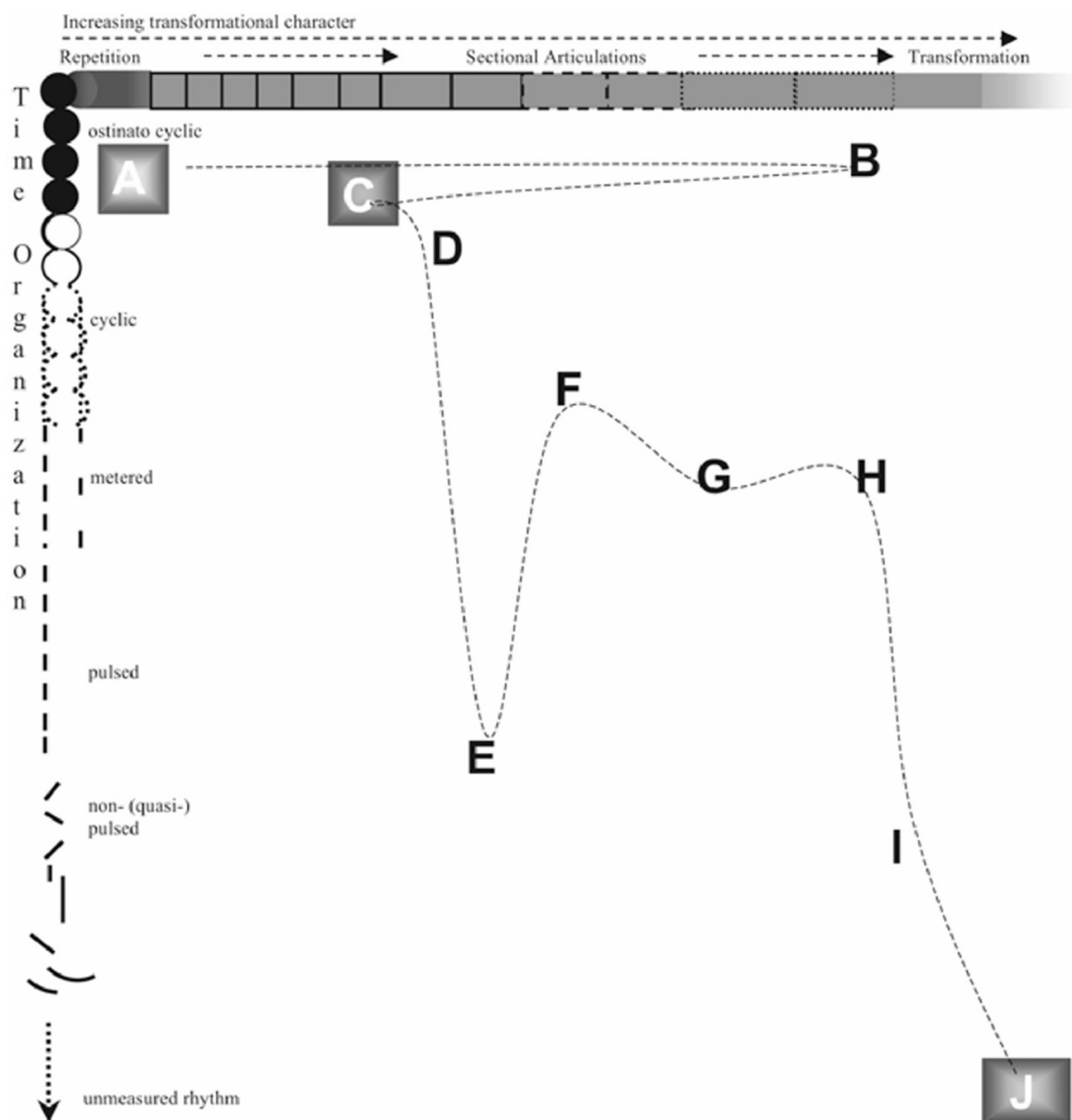
We can combine the four features of my definition into a multi-dimensional space that allows for the comparison of the metric experience produced by different musical passages, pieces, and styles. Michael Tenzer’s two-dimensional topography of musical time sets an excellent precedent for this sort of musical space; his visual representation is reproduced here as Example 1.9. Tenzer’s comparative goals are similar in some respects to my own; comparing a number of musics from different world traditions, he notes that, “Description of each selection’s place on the continuum reveals unsuspected similarities and discontinuities between the musics’ features, and places each among the family of human musical structures in a fully global perspective.”⁷⁷ Each excerpt is represented by a letter in the center of Tenzer’s topography.

Despite commonalities of purpose, our methods are quite distinct, and the features Tenzer highlights diverge from my own in certain crucial ways. His project concerns itself with three features: “*time organization* (mental constructions of time through which we cognize musical rhythm); *configuration* (how we understand musical events to be grouped); and *formal continuity* (the overarching quality of temporal process).”⁷⁸ Formal continuity, although somewhat relevant to higher levels of metric organization generally relegated to the subject of “hypermeter,” is nevertheless beyond

⁷⁷ Tenzer, “A Cross-Cultural Topography of Musical Time,” 415.

⁷⁸ Ibid., 419.

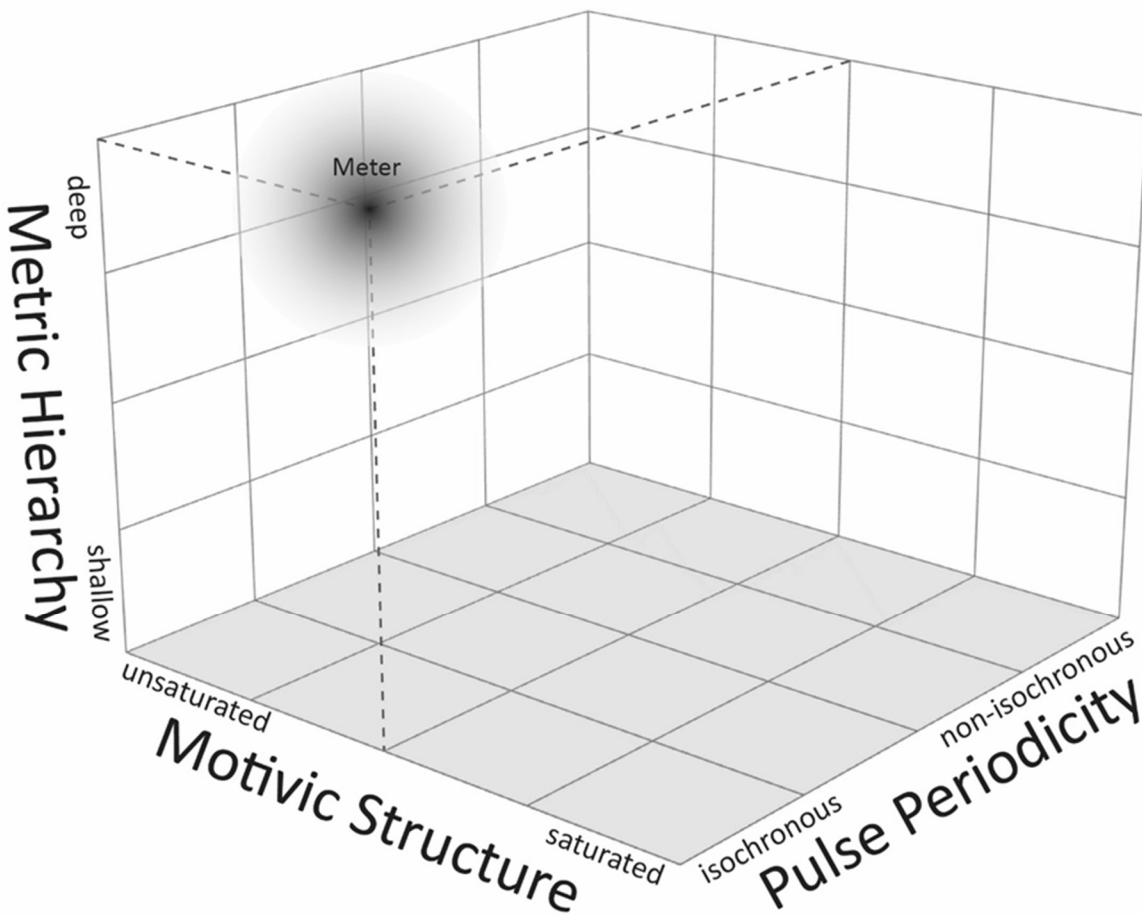
the scope of the present project, which is concerned with meter in particular rather than temporality writ large. Yet more importantly, it's clear that Tenzer's approach combines features of metric organization and musical content together, as in the y axis of Example 1.9, which unites aspects of my pulse, hierarchy, and motive continua into a single dimension. As one moves up this axis, pulses become more periodic—and then more numerous—until one reaches “metered;” at this point, content becomes relevant, as “cyclic” and “ostinato cycle” are both defined by the repetition of specific material on the musical surface.



Example 1.9. Tenzer's two-dimensional representation of musical temporality (Figure A.2; Tenzer, 2011)

Yet, as Motive-Directed Meter demonstrates, none of these features are necessarily correlated. The relationship between motive and periodicity, in particular, is much more complex than represented here. For these reasons, we cannot use Tenzer's space as a field in which to situate MDM. What we need is a way to reduce amount of information in my four-dimensional definition to a more manageable quantity. Thankfully, one of the four features is less relevant to the specific particularities of MDM. Although theoretically important, timepoint specificity—dealing as it does with basic, low-level musical objects—provides the least information of the four features, and therefore the smallest practical benefit. I will therefore reduce out the first feature when creating my visual representation, arriving ultimately at a three-dimensional visual space in which to illustrate metric categorization; this space, referred to hereafter as the *Flexible Metric Space* or "FMS," is represented as Example 1.10.

The Flexible Metric Space arranges my pulse, depth, and saturation definitional features along separate axes, allowing us to locate (portions of) pieces of music, and even the central tendencies of certain styles and genres, relative to one another and to prototypical metric organization. As discussed above, prototypical meter lies at the confluence of isochronous pulse, deep hierarchy, and moderate motivic saturation—the center of the top front face of the FMS, as depicted in the example. Any music that elicits even the slightest sense of felt pulse can be situated somewhere within this space; to demonstrate its usefulness, let's consider a few difficult cases that have given previous scholars pause, causing them to set aside the label "metric" and deploy or invent new quasi-metric terminologies.



Example 1.10. The Flexible Metric Space (FMS) depicting the location of prototypical musical meter

Martin Clayton uses the term “free rhythm” as an umbrella category to describe a number of musics that scholars have categorized as “unmetered, unmeasured, ametrical or amensural music, of ‘flowing rhythm,’ or even of ‘free meter’.”⁷⁹ Discussing the problematic nature of all of this terminology and of the concept of musical meter itself, he suggests that a “Truly general theory of metre would have to account for metrical structures in which one beat is noticeably longer than the others, as in the slow 4-beat ‘metres’ of the Japanese court music *gagaku*; for ‘metres’ which appear to be entirely unrelated to elements of the rhythm they ‘organize’; and for the multi-dimensional complexities of African

⁷⁹ Martin R. L. Clayton, “Free Rhythm: Ethnomusicology and the Study of Music without Metre,” *Bulletin of the School of Oriental and African Studies, University of London* 59, no. 2 (1996): 323.

polyrhythm.”⁸⁰ Using this suggestion as a provocation, let’s consider how my flexible natural category conception of meter would account for these structures. I am, of course, an outsider to the traditions discussed below, and discuss them only from a distance though the writings of more familiar scholars. With any listener-oriented approach, there is the question of *which* listener—I can here only describe my own etic experience. I intend, in this discussion, to demonstrate the flexibility of the model, rather than to make any particular pronouncements about these traditions. With hope, these cursory observations may encourage more nuanced engagement with the model by practitioners and scholars with deep knowledge of these musics.

First, Clayton describes the presence of a single longer beat in *gagaku* repertoires. In the “metrical” portions of *tôgaku*—a significant portion of *gagaku* musics stemming from the Tang era—a regular rhythmic cycle underlies and orients the music, in contrast to the freer, more brief non-metrical sections. These metric sections feature recurring “parts” akin to measures, which are grouped together into sets of four, six, or eight to form a larger recurring rhythmic unit, as depicted in Example 1.11.⁸¹ The final measure of each unit is punctuated with a hit of the large *taiko* drum, symbolized by the black circles in this diagram. Within the structure of each measure (“part”), however, as Clayton observes, the beats—four, in the case of Example 1.11—are not equal; rather, the last may be subjected to durational manipulation. Naoko Terauchi notes:

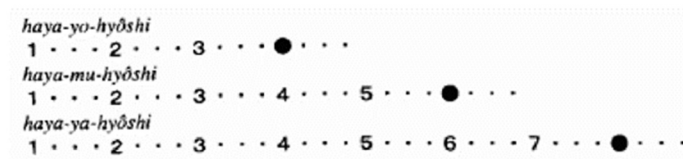
Beats in contemporary *tôgaku* performance are actually not equal in duration but rather elastic. In particular, often the last beat of a measure is extended and the original tempo recovered on the first beat of the next measure. Over the larger scale, the tempo also changes, often beginning slowly...then gradually accelerating toward the end.⁸²

⁸⁰ Ibid., 328.

⁸¹ Naoko Terauchi, “Surface and Deep Structure in the *Tôgaku* Ensemble of Japanese Court Music (*Gagaku*),” in *Analytic and Cross-Cultural Studies in World Music*, ed. Michael Tenzer and John Roeder (New York: Oxford University Press, 2011), 21.

⁸² Ibid., 22.

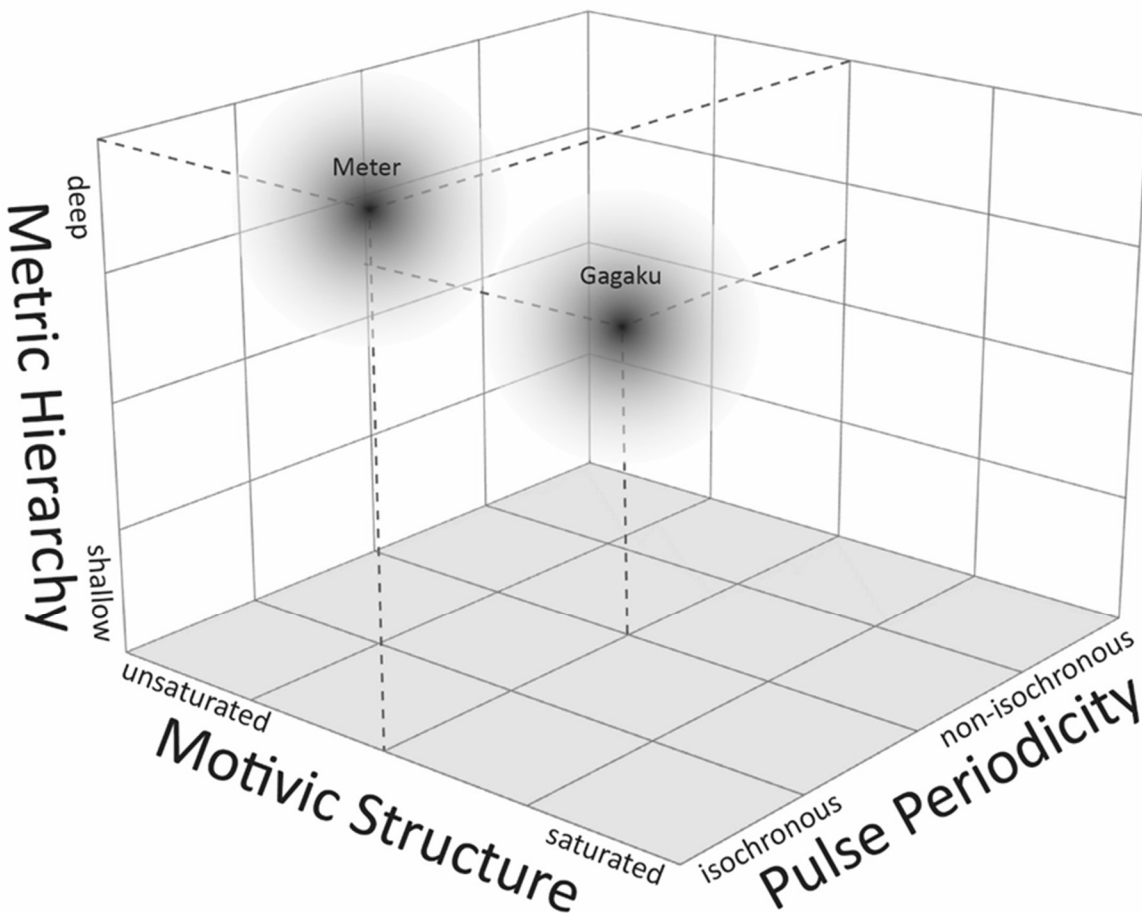
Although there is no conductor, the ensemble is able to stay together, despite any stretching of this final beat.⁸³ This coordination would seem to require entrainment, if to an irregularly-spaced pulse. Indeed, the “beats” of each measure would seem to be *conceived* of as equal—and even *perceived* to be equal by some observers.⁸⁴ In the FMS representation of this type of *gagaku* music given in Example 1.12, pulses are therefore represented as being rather non-isochronous. The metric hierarchy, however, may still be quite deep because of this conceptual equality—indeed, at least the “hypermetric” level of the types of cycles represented in Example 1.11 are highly relevant. The motivic structure of *gagaku* musics is variable, and I’ve therefore simply represented a proposed central tendency. Indeed, the FMS is able to accommodate the flexible beat structure of these musics.



Example 1.11. The beat structure of metrical gagaku (Figure 1.1; Terauchi, 2011)

⁸³ Ibid., 31.

⁸⁴ Hermann Gottschewski, for example, seems to clearly assert the equality of all beats in *gagaku*. Hermann Gottschewski, "Nineteenth-Century *Gagaku* Songs as a Subject of Musical Analysis: An Early Example of Musical Creativity in Modern Japan," *Nineteenth-Century Music Review* 10 (2013): 244, 51.



Example 1.12. The FMS depicting a general location for the flexible beats of metrical gagaku.

Second, Clayton describes the need to account for meters which “appear to be entirely unrelated to elements of the rhythm they ‘organize,’” referring in a footnote to the interaction between vocal line and percussive accompaniment in certain Dakota musics, as described by Frances Densmore and Curt Sachs.⁸⁵ Similarly, Alexander Cringan claimed that certain Iroquois musics are structured such that the “rhythmic accompaniment has absolutely no connection with the rhythm of the melody.”⁸⁶ Yet Hewitt Pantaleoni’s close analysis of the rhythmic patterns in one of these 1911 recordings, “Song in

⁸⁵ Curt Sachs, *Rhythm and Tempo: A Study in Music History* (New York: Norton, 1953).

⁸⁶ Quoted in Hewitt Pantaleoni, “One of Densmore’s Dakota Rhythms Reconsidered,” *Ethnomusicology* 31, no. 1 (1987): 35.

Honor of Gabriel Renville,” shows that, despite claims of unrelatedness, the different parts in this song are instead related in complex ways that resisted the initial analyses of those scholars. Despite the conclusive results of this analysis, Clayton maintains that we cannot rule out the possible existence of such phenomena.⁸⁷ Although premised upon dubious analysis, it’s true that such structures *might*, in theory, exist—as a thought experiment then, let’s consider how the flexible model would accommodate them.

There are two types of musical organization which both match Clayton’s description: 1) two or more pulses existing simultaneously but unrelated to one another; or 2) a pulse unrelated to free-floating, distinctly un-pulsed part. We’ll consider these possibilities in order. First, although the term “polymeter” is in somewhat wide circulation, repeated experiments have demonstrated that the phenomenon is psychologically untenable, requiring, as it would, simultaneous entrainment of two distinct metric frameworks. Summarizing this research, Justin London writes, “When confronted with complex polyrhythmic stimuli, listeners use one of two metric strategies. They will either (1) extract a composite pattern of all of the rhythmic streams present and then match it to a suitable metric framework; or (2) focus on one rhythmic stream and entrain to its meter while treating the other rhythmic stream(s) as ‘noise.’”⁸⁸ This “noise” may be relatively chaotic, or be understood as familiar types of metric dissonance, such as those described by Harald Krebs.⁸⁹ Depending on the listener’s familiarity and stylistic competency, they may be able to switch which pulse they hear as “figure” and which as “ground,” enabling drastically different listening experiences of the same passage.⁹⁰ It seems clear then that two (or more) truly unrelated pulses, since they cannot combine into a coherent

⁸⁷ Clayton, “Free Rhythm: Ethnomusicology and the Study of Music without Metre,” 328.

⁸⁸ London, *Hearing in Time*, 67.

⁸⁹ See Krebs, *Fantasy Pieces: Metrical Dissonance in the Music of Robert Schumann*.

⁹⁰ London, *Hearing in Time*, 67.

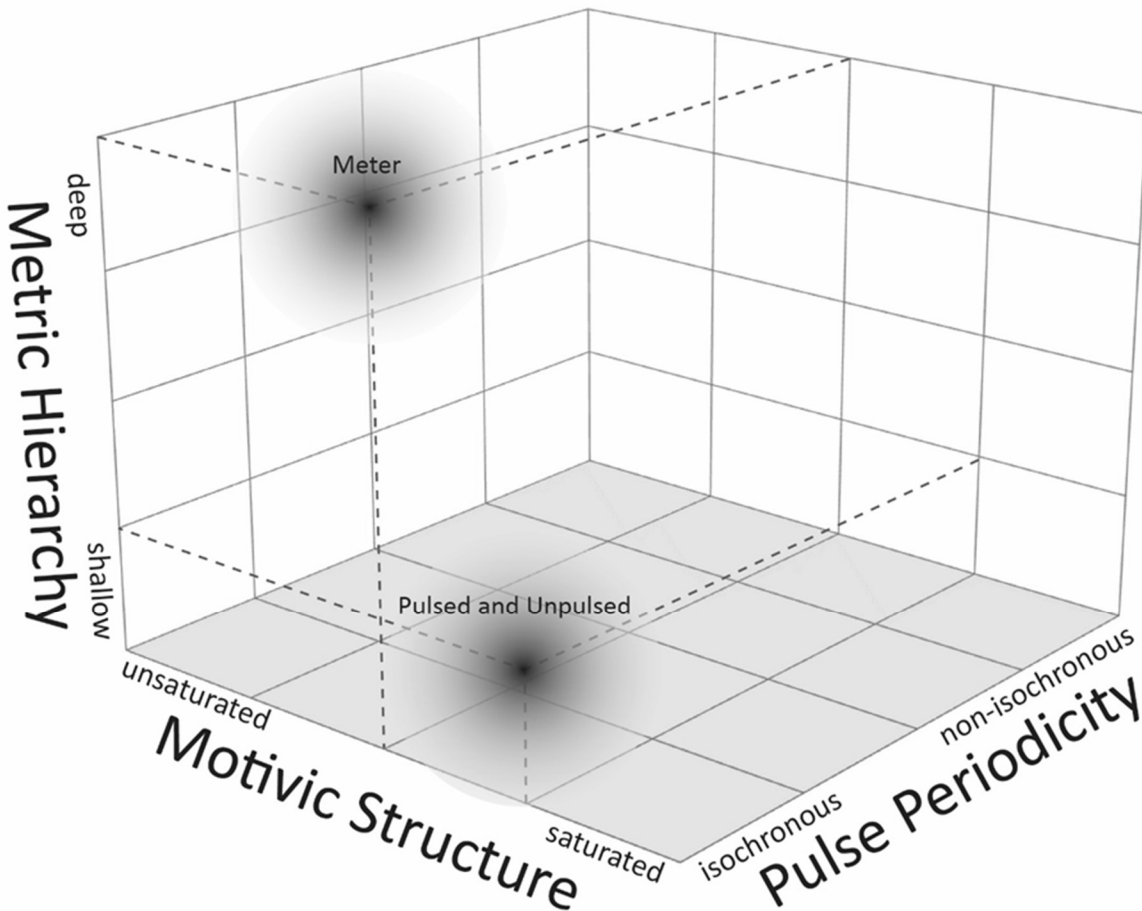
recognizable metric framework, would mandate the latter of London's proposals, in which a listener prioritizes one stream as metric at the expense of the other, which would be heard as "noise" in relation to it. That is to say, we would be dealing with a rhythmic, as opposed to metric, phenomenon, which would complicate the surface rhythm while not fundamentally altering the underlying metric structure; as such, there is no need to locate this (hypothetical) phenomenon within the FMS.⁹¹

Second, let's consider the possibility that the unrelated pulse is not unrelated to a second pulse, but to an unpulsed, independent part. In this case, a listener may pursue one of two paths, depending on preferences and the actual structure of the musical surface. In the first case, they may attend primarily to the unpulsed part(s) and not entrain the pulsed part(s) at all. The periodicity of this pulsed part would be incidental, and, without entrainment, the experience could not be considered metric. As such, this path lies outside the scope of this project. Following the second path, a listener would entrain the pulsed part(s) and not attempt to entrain the unpulsed materials, which may be perceived as only loosely related to the pulsed part(s)—or not related at all. From an entrainment perspective, we would only be dealing with the durational structure of the pulsed materials. In the case of the Dakota singers discussed by Sachs and Pantaleoni, the clearly pulsed part comprises isochronous beatings of a small drum in "Pairs of eighth notes."⁹² In this case, the motivic structure is extremely saturated by the consistent "rhythmic motive" of eighth note pairing. The pulse is isochronous, and the metric hierarchy is relatively shallow, since only two levels are instantiated (the unit pulse and the next-slower pulse instantiated by the duple pairings). Higher levels must be dependent upon subjective metricization. Furthermore, although the listener might not be *entraining* the unpulsed materials, they would

⁹¹ The situation can, of course, become more complicated still by the complex polyrhythmic interactions produced by two simultaneous tempi. See, for example, the concept of "dual-track time" in Billie Holiday's vocal performance advanced in Rachel V. Huang and Hao Huang, "Billie Holiday and "Tempo Rubato": Understanding Rhythmic Expressivity," *Annual Review of Jazz Studies* 7 (1994).

⁹² Pantaleoni, "One of Densmore's Dakota Rhythms Reconsidered," 37.

nevertheless wield an influence on the formation of slower pulses as the placement of significant events suggests recalibrations of metrically deep moments. For these reasons, the metric hierarchy must be considered relatively shallow. This hypothetical situation is diagrammed in Example 1.13.



Example 1.13. The FMS depicting a general location for a simple pulsed part in conjunction with an unpulsed part

This brings us to the third of Clayton's structures that requires analysis, "African polyrhythm." Clayton does not clarify the specific African repertoires with which he is concerned, nor does he provide a definition of polyrhythm. Thankfully, in his work on the music of the Central African Republic, Simha Arom provides a detailed study of polyrhythmic structures. I will therefore use his definitions as a guide, recognizing the still limited repertoire this discussion covers and the possibility that it may not fully map

onto Clayton's intended target. Arom dispenses with the term "metre" entirely, though by it he seems to understand something much more restrictive than the regulating framework I put forth here.⁹³ And although his terminology differs, he seems to describe something compatible with my definition of meter, though with one important exception. First, Arom uses the term "pulsation" in a largely equivalent sense to the common use of *tactus* as an isochronous, continuous "common denominator" reference unit that may be actually sounding or simply implicit.⁹⁴ This "pulsation" is then divided into the "minimal operational value," analogous to our *unit pulse*, as the "smallest *relevant* duration obtained after subdivisions; all other durations are multiples of this value."⁹⁵ This "minimal operational value" may be divisions of the "pulsation" into 2, 3, 4, 5, or 6 units. Finally, Arom describes the "period" as the larger cycle of "pulsations," which feature similar or identical material recurring upon each repetition of the period.⁹⁶

So far, so good; but we haven't yet addressed polyrhythm itself. In order to do so, we must make clear the one important distinction between our definition of meter used here and Arom's conception of time organization in the Central African Republic. For although there are clearly distinct simultaneous pulses in relation to one another—from fastest to slowest, the "minimal operational value," "pulsation," and "period"—there is no pulse between the "pulsation" and the "period" despite the fact that the latter can be up to 12 or more pulsations in length. Arom summarizes this structure:

Metrically speaking, the period can thus be broken down on two lower levels, into the pulsation and the operational values it contains. We must remember that, characteristically, this organization involves no intermediate level between the period itself and the pulsation,

⁹³ Simha Arom, *African Polyphony and Polyrhythm: Musical Structure and Methodology*, trans. Martin Thom, Barbara Tuckett, and Raymond Boyd (Cambridge; New York: Cambridge University Press, 1991), 201.

⁹⁴ *Ibid.*, 202, 30.

⁹⁵ *Ibid.*, 231.

⁹⁶ *Ibid.*, 230.

consisting of a regular accentual system, i.e., the ‘measure’ with its characteristic strong beat, as found in Western music. Consequently, *the ‘beats’ comprising the period all have equal status*.⁹⁷

This lack of intermediate pulsation is what creates the space for polyrhythmic structures between the regularity of the period and the orienting periodicity of the pulsation. Arom defines the polyrhythms produced by nonmelodic percussion instruments as the “Superposition of two or more rhythmic figures, each of which is so articulated that its constituent elements...are interspersed among those of the others so as to create an interwoven effect.”⁹⁸ These figures interlock with one another and, crucially, divide up the sometimes quite significant span of the period into different subdivisions. Although there is no concept of “strong” or “weak” beat, it may be that these distinct figures, by chopping up the period into smaller divisions, create something akin to an intermediate pulse, though whether performers *feel* this intermediate level *as* a pulse is unknown. If so, it may be that there is simply no *governing or global* intermediate pulse coordinating all of the distinct rhythmic parts; rather, each part maintains its own intermediate pulse, all of which are oriented together by the regularity of the “pulsation” and “period.”

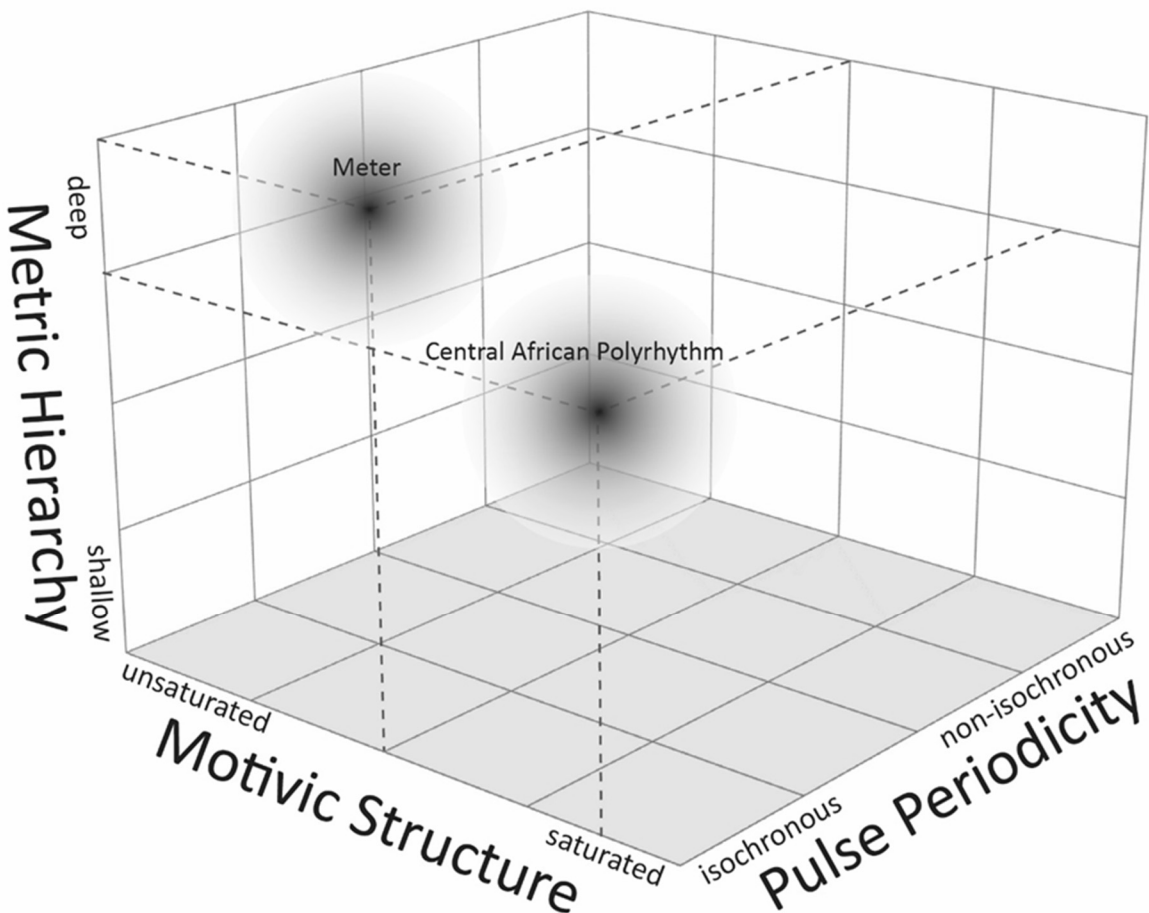
It should by now be clear how Arom’s conception of polyrhythm in the Central African Republic relates to prototypical meter as I define it under the Flexible Metric Space. A representation is given as Example 1.14. Motivic structure is here *highly saturated*, since the cycles of the “period” itself comprise repetitions or near-repetitions of the same recurring content. Individual pulses are generally extremely periodic—particularly the isochronous “pulsation” and “period”—though there is room for unequal divisions of the “pulsation” into, for example, sets of 5. Given the flexibility of the pulse space between the “pulsation” and “period,” however, this intermediate pulse—if felt at all—is open to extreme variability, both for individual performers, who may divide the period into unequal segments, and for

⁹⁷ Ibid., 231. Emphasis original.

⁹⁸ Ibid., 216.

Note that this is quite different from typical Western definitions of polyrhythm. Consider, as exemplar, London’s definition of polyrhythm as “Any two or more separate rhythmic streams in the musical texture whose periodicities are noninteger multiples.” London, *Hearing in Time*, 66.

listeners, who may shift focus from part to part and, as a result, experience a number of distinct spans. These polyrhythmic structures exhibit a combination of strict isochrony and variable non-isochrony, which I simply and represent as *moderate* in Example 1.14. Finally, the metric hierarchy—although potentially missing an intermediate level, as proposed by Arom—is nevertheless necessarily rather deep, as the recurring cycle of the “period” must be kept constantly in mind in order for it to serve its orienting function; it may be that higher levels still are musically relevant. As such, this music is represented as somewhat *deep* in Example 1.14.



Example 1.14. The FMS depicting a general location for the polyrythms of the Central African Republic, as described by Simha Arom

As the above discussion makes plain, the FMS is able to accommodate any musics that exhibit a trace of pulsation, even those that have previously proven difficult for more traditional definitions of musical meter. It does so by permitting gradation of multiple parameters simultaneously, allowing us to assess relative similarity among several distinct domains. This provides a much richer picture than a binary “metric/non-metric” distinction, and more even than a single-parameter metric continuum. With the FMS thus established, and its usefulness demonstrated, we can return to Motive-Directed Meter, flesh out the provisional definition offered in the introduction to this chapter, and situate the phenomenon relative to others in metric space.

III. MOTIVE-DIRECTED METER: A DEFINITION

In the context of Examples 1.1a and 1.3—excerpts of Motive-Directed Meter from Missy Mazzoli and Igor Stravinsky, respectively—we arrived at a provisional definition of MDM that featured two components: familiar motivic content and changing durational spans. It may be clear at this point how these two features can be translated into the FMS; but before this, let’s isolate MDM with a bit more specificity. It’s worth acknowledging up front that MDM, like “metric music,” is itself a natural category—that certain pieces of music will give rise to metric phenomena that fit the following definition more or less well, and will therefore serve as more or less prototypical representatives.

Prototypical MDM, as I define it, obtains in the presence of four conditions or “components:” *isochronous unit pulse, irregular slower pulses, a small number of motivic ideas, and a generally homophonic texture.*⁹⁹ Let’s consider each of these components in more detail.

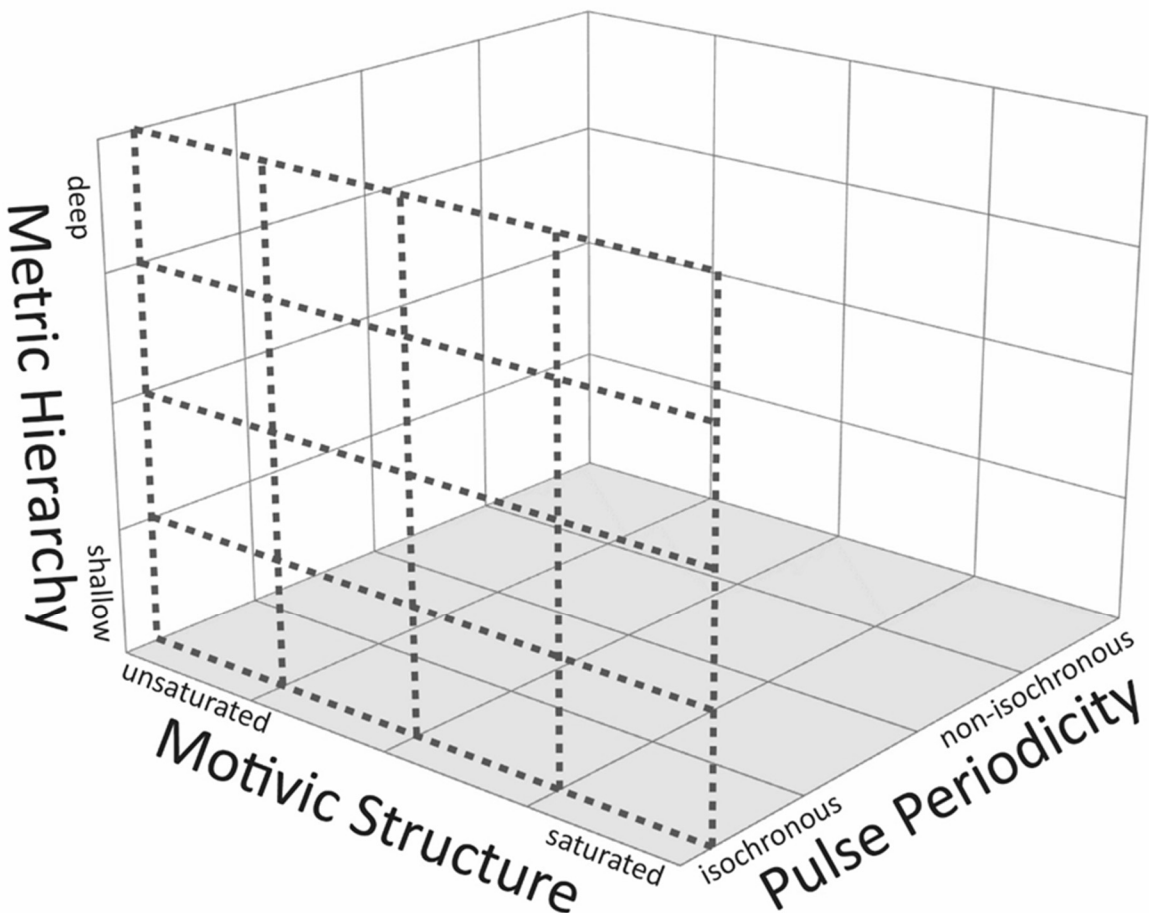
⁹⁹ Note that the unit pulse does not have to be literally articulated by onset points. It is enough that the pulse inferred by the listener is perceived to be isochronous. A.D. Patel, et al. describe a distinction between “weakly” and “strongly” metrical contexts; in the latter, the pulse is continually articulated, while in the former, it must often be inferred. See Aniruddh D. Patel et al., “The Influence of Metricality and Modality on Synchronization with a Beat,” *Experimental Brain Research* 163 (2005).

First, the temporal structure of Motive-Directed Meter depends on a consistent, unambiguously isochronous unit pulse to act as a stable frame of reference for all other rhythmic activity. This pulse is represented by the constant eighth notes of examples 1.1 and 1.3. It is the consistency of this fastest level of the metric hierarchy that allows all slower pulses, and all rhythmic activity of the musical surface, to be heard as irregular and yet definitely metric by providing an invariant context for comparison. No matter what happens at these slower levels of the hierarchy—no matter how unpredictable and disjunct the rhythmic surface becomes—a perceptually periodic unit pulse provides a “ground” in which to situate rhythmic (and metric) “figures,” and a unit of measurement against which one is able to consistently distinguish “short” and “long” timespans—generally groups of 2 and 3 articulations of the unit pulse, respectively—from one another. I say *perceptually* periodic because the unit pulse does not have to (and cannot in practice) be literally periodic. Nevertheless, in order to stabilize the other rhythmic activity and make it perceptually manageable for the listener, this pulse must remain consistent enough that it can be taken for granted and used as a basis for comparison for other metric and rhythmic events. The unit pulse places MDM near the front face of the FMS where prototypical meter itself resides, as shown in Example 1.15.

Second, Motive-Directed Meter necessitates that deeper levels of the metric hierarchy be notably non-prototypical in their organization. This is a more precise way of rephrasing that part of the provisional definition that required rapidly-changing meter signatures.¹⁰⁰ Prototypically, the pulse directly slower than the unit pulse resides in the “conceptually equivalent” portion of the pulse prototypicality continuum (Example 1.6), where spans of 2 and 3 units are combined into irregular sequences. This clarifies why the unit pulse must be regular, serving, as it does, as the constant counting unit that permits unambiguous distinctions between spans of 2 and 3 units. If this pulse is irregular, any slower pulse is likely to be even less prototypical in organization, since mixed spans of 2 and 3 may be

¹⁰⁰ Of course, the actual notated signatures are not determinative of perceived meter.

articulated by any one of six different spans, as enumerated in Example 1.16. Thus the pulses comprising the metric hierarchy of MDM musics will quickly shade off into decreasing prototypicality as one moves up the hierarchy. This fact necessitates a revision of Example 1.15, which presented a single FMS “pulse periodicity” value. Indeed, the choice to represent this feature of the FMS with a single value is a necessary simplification; complete precision would require a separate entry for each pulse. This is true for nearly any musics represented in the FMS, since, as a result of subjective metricization, the perception of a single pulse alone is extremely uncommon.



Example 1.15. The FMS depicting the location of the unit pulse in MDM

Span	Intermediate (unordered)
4	22
5	23
6	33 or 222
7	223
8	233
9	333

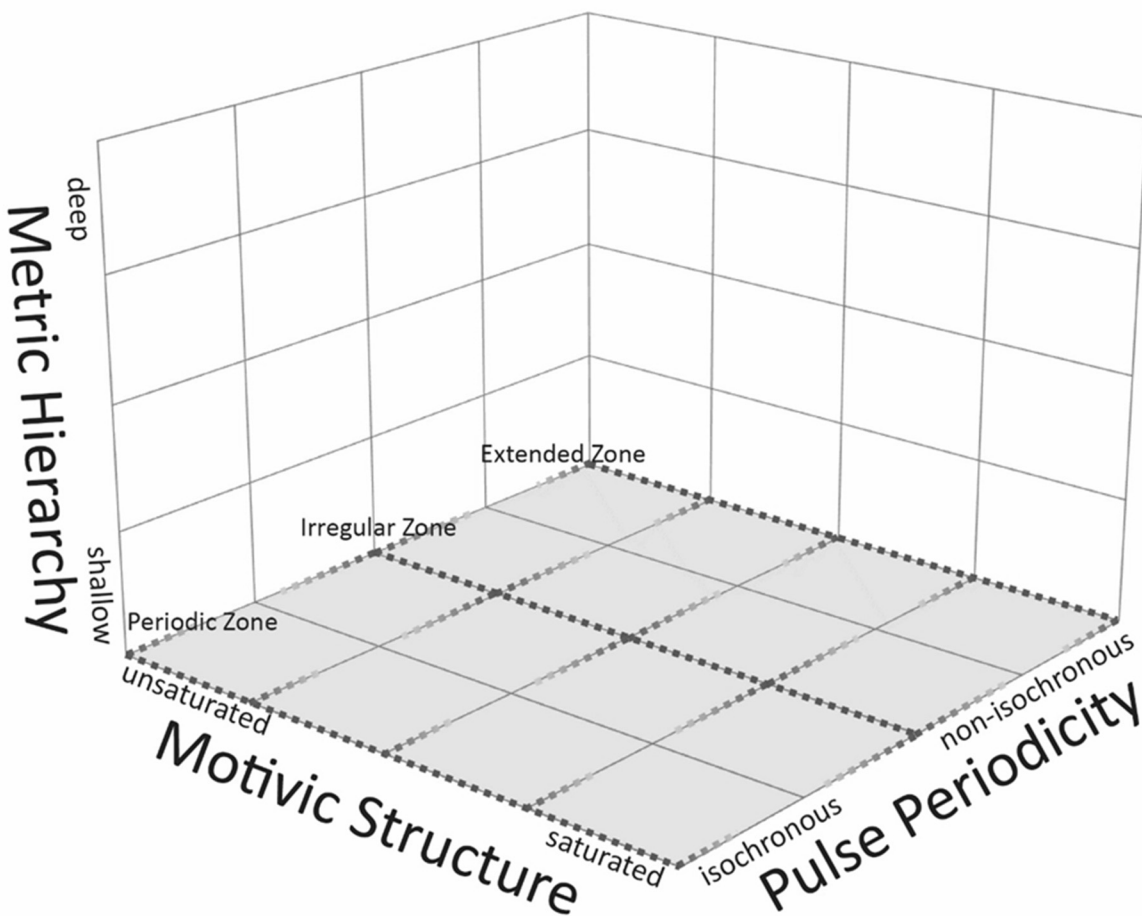
Example 1.16. All possible unordered combinations of sub-spans 2 and 3 at two pulse levels

More than one pulse can be normatively isochronous at the fast end of the metric hierarchy without destroying the sense of MDM. Regularity of the unit pulse is required, but one or more adjacent slower pulses may also be prototypically near-isochronous. Rather than individual pulses, then, we might speak of “zones” of the MDM metric hierarchy: the fastest “periodic” zone features perceptually isochronous pulses; the second “irregular” zone comprises any conceptually isochronous pulses that combine spans of 2 and 3, and generally contains only a single pulse; and the third “extended” zone that shades off into obscurity, as discussed above. This is depicted as three separate zones in Example 1.17a, while Example 1.17b shows the correlation between the depth of the particular pulse (NB: not the depth of the entire hierarchy itself) and the relative prototypicality of that pulse.

In a loose sense, even many normatively metric musics feature a similar set of zones: in common-practice tonal music, for example, higher “hypermetric” levels of organization typically feature irregularities that cause significant deviations from true isochrony.¹⁰¹ The crucial difference is the relative size of each zone: in normatively metric musics, the lowest periodic zone is quite large, with irregularities arising only in the realm generally accorded to hypermeter. In MDM, this periodic zone is compressed, most commonly into a single pulse, the unit pulse; irregularities are therefore much quicker and much more perceptually available, occurring in the “sweet spot” of maximal

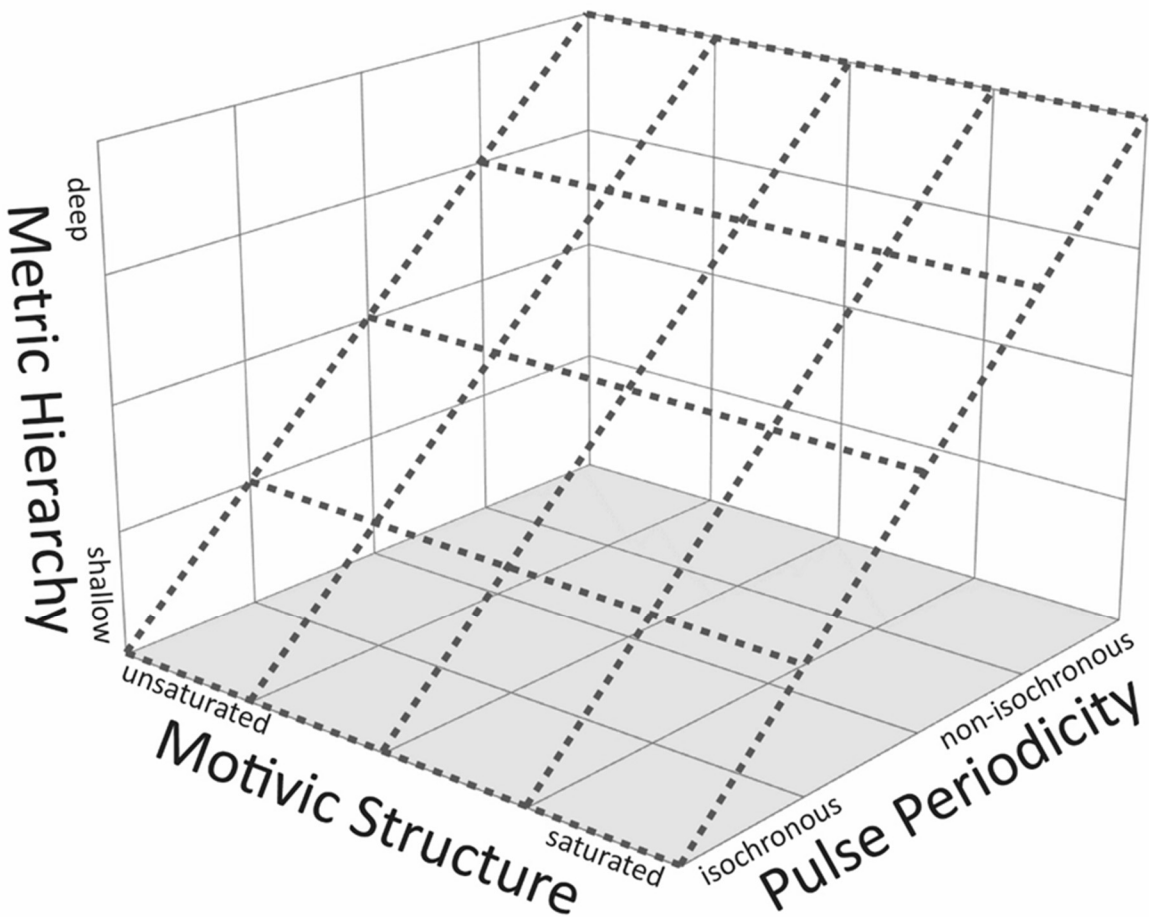
¹⁰¹ Kramer, *The Time of Music: New Meanings, New Temporalities, New Listening Strategies*, 99-102.

entrainability.¹⁰² It's possible for two—perhaps even more—pulses to occupy this fastest zone and still effect the kinds of unpredictability required in MDM, yet, as the listener has more and more stable pulses to entrain, the sense of temporal organization departs further and further from prototypical MDM. Of course, the boundaries between zones are flexible and can change within a single piece as the music moves in and out of MDM organization; even within an excerpt of MDM, these boundaries frequently change dynamically.



Example 1.17a. The FMS depicting the three different pulse zones of MDM as three distinct areas

¹⁰² Summarizing available research on the subject, David Huron suggests a range of 80-100 BPM as optimal. Huron, *Sweet Anticipation*, 175-76. Justin London suggests “maximal pulse salience” resides at approximately 100 BPM. London, *Hearing in Time*, 31.



Example 1.17b. The FMS depicting the correlation between the depth and the prototypicality of a given pulse

We can see an example of changing boundaries in Example 1.18, which presents a passage from the first movement of Bartók's First Piano Concerto. Here I've provided lines above the staff to indicate when the given periodic pulses are established and disestablished in the course of the listening process. For the sake of this analysis, pulses are considered to be established once the given duration has been articulated once—this is where the horizontal lines begin—and considered disestablished in the face of strong contradictory evidence, as indicated with bold "X" markings. Each of the first two systems, which are directly parallel to one another, begin with several measures of consistent meter, enabling the accumulation of stable pulses; each, however, denies the half- and whole-note pulses with the 3/4 bars

The image displays a musical score for a passage from the first movement of Bartók's First Piano Concerto. The score is written for piano and includes a metronome marking of 116. The notation features complex rhythmic patterns with many beamed notes. Above the piano staves, there are horizontal lines representing established pulses. These lines are marked with 'X' at specific points, indicating where the established pulses are disconfirmed. The score is divided into two systems, each with a piano staff and a corresponding line staff.

Example 1.18. A passage from the first movement of Bartók's First Piano Concerto; lines indicate established pulses, which are disconfirmed at each "X" (Bartók, 1954)

of mm. 4 and 8. These metric changes do keep the quarter and eighth notes constant, however. In the third system the process is intensified, both temporally and hierarchically: the rate of metric change increases, causing denial of pulses at the arrival of m. 11, where, in parallel places in the first two systems, higher levels were established. This moment also cancels the quarter note pulse for the first time, lowering the periodic zone to a single pulse (the eighth note) for the first time in the passage. Clearly, the relative size of the different zones is variable in the course of MDM passages as the rates and kinds of metric changes shift.

The third definitional component of Motive-Directed Meter concerns motivic organization, and necessitates that pieces feature only a small number of recognizable, frequently-recurring motivic ideas. Three parts of this mandate warrant unpacking. First, a “small number” is unspecified, but should remain manageable, such that a listener can retain all recurring motives in memory and make the necessary associations as they arise. Many passages of MDM feature only a single motivic idea continually repeated with temporal variation, as in the riff from the 2007 song “Synaptic Plasticity” by American technical metal band Blotted Science, transcribed in Example 1.19.¹⁰³ Here a melodic cell labeled “A” recurs four times in succession, then the entire pattern repeats; this section appears multiple times throughout the song. Although there is only a single motive—albeit featuring distinct submotivic components—this motive is subjected to significant durational variation as it repeats, appearing, in terms of notated quarter notes, in the pattern (5657). Note that neither the notated eighth nor quarter pulses are disrupted throughout the passage; the periodic zone therefore comprises both of these levels.

¹⁰³ See also the passage from Stravinsky’s *Les Noces* given as Example 1.3.

This passage may also be heard as alternating between two motives, A and B: A begins each measure and is invariant, while B serves as a variably-lengthed pickup figure to the next downbeat.

0:20 ♩ = 207

Guitar

Drum Set

A A'

Gtr.

D. S.

A A'

Example 1.19. A transcription of a passage from “Synaptic Plasticity” by Blotted Science (Blotted Science, 2007)

A second part of the motivic component mandates frequent repetition; as before, there is no specific numeric requirement here. Rather, each motive should recur often enough that it is retained in memory; what this entails will vary widely depending on the number of motives in circulation, their relative lengths, complexity, and memorability. Yet these two components—repetition and a small number of forms—are ultimately in service of the third: recognizability. Citing Wittgenstein, Robert Goldstone and Alan Kersten note that “the ‘act of ‘seeing something as X’ rather than simply seeing it, is fundamentally an act of categorization.”¹⁰⁴ Hearing a musical event as an instance of a particular known motive is an act of categorization, requiring the creation of a connection between temporally distant

¹⁰⁴ Goldstone and Kersten, “Concepts and Categorization,” 599.

events on the basis of a sense of shared identity, thereby “thingifying” that object as a discrete entity.¹⁰⁵

This can only occur when the elements are distinctive and few enough to be retained in working memory.¹⁰⁶

Whatever the exact nature of the motivic content, primary melodic materials must be amenable to motivic categorization in order for Motive-Directed Meter to arise. MDM revolves fundamentally around the tension between the familiar structure of the motivic ideas and the unfamiliarity of the metric spans those ideas articulate, as described in Part I. My approach to motivic attribution will be flexible throughout the analyses that follow in subsequent chapters, inspired in large part by Zbikowski’s natural category approach described above. There will always be ambiguity concerning what level of “grouping” constitutes the main level at which motivic perception occurs. Returning to Example 1.19, for example, I have chosen a level which coincides with repetitions and produces manageable metric spans. Within each large motive label “A,” one could indicate smaller submotivic components; a listener might prefer to instead hear these as the “motives” and my motives as larger motive sets—ultimately such distinctions do not significantly alter the results of the analyses that follow in chapters 2-4. Such shifts generally amount to changes in labeling alone, and do not fundamentally transform the listening experience; they are analogous to changes in labeling pulses within the metric hierarchy while keeping the relative proportions of the hierarchy intact, which is unlikely to result in significant perceptual changes.

¹⁰⁵ See Hanninen on association: Hanninen, *A Theory of Music Analysis: On Segmentation and Associative Organization*, 20, 32-34.

Joseph Dubiel, Marion Guck, and Bryan Parkhurst explore the application of Wittgenstein’s “Seeing-As” to the musical domain, as “Hearing-As.” See Joseph Dubiel, “Music Analysis and Kinds of Hearing-As,” *Music Theory and Analysis* 4, no. 2 (2017).

See also Marion A. Guck, “Perceptions, Impressions: When Is Hearing “Hearing-As”?”, *ibid.*

See also Bryan Parkhurst, “Aspects of Analysis,” *ibid.*

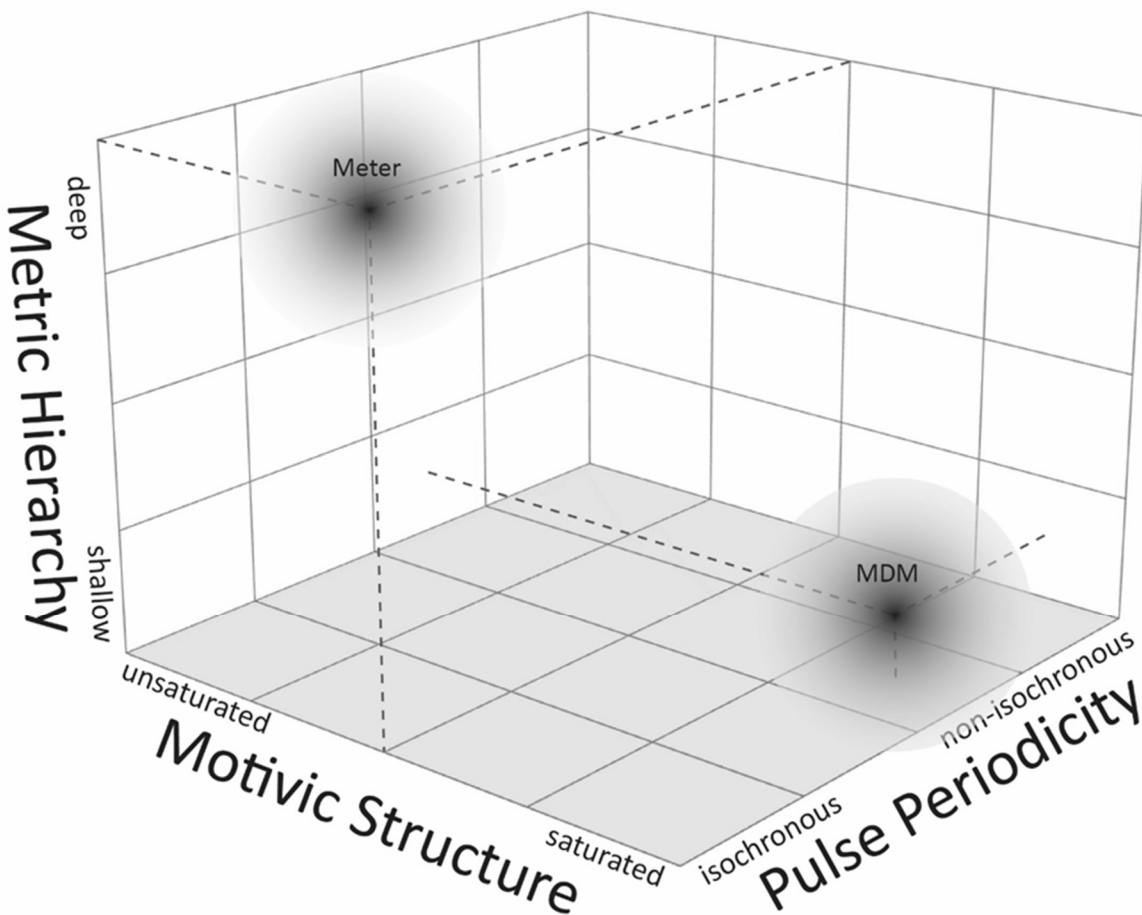
¹⁰⁶ See Candace Brower, “Memory and the Perception of Rhythm,” *Music Theory Spectrum* 15, no. 1 (1993).

Returning to the four-component definition of Motive-Directed Meter, the fourth and final necessity is that MDM passages feature a largely homophonic texture. This requirement is ultimately in support of components two and three: a homophonic texture permits clearer metric boundaries, as well as clearer separation between, and isolation of, motivic ideas. We have already seen that MDM requires clear melodic and rhythmic ideas to be prominent in the musical texture; these may exist with or without accompanimental parts. The primary flute part given in the MDM passage of Example 1.1a, for instance, is supported only by minimal piano harmony, over which the melodic line soars uncontested. The passages from *Les Noces* and Bartók's Piano Concerto no. 1 likewise feature only supportive accompanimental figuration. In "Synaptic Plasticity" (Example 1.19), the main melodic material is the *only* pitched material in play. The drum set part then articulates and clarifies the underlying rhythmic and metric patterning.

With this definition of MDM thus established, we can complete our situating of the phenomenon in the FMS, depicted in Example 1.20. As a supporting component, homophony does not have a particular location. The third component, high motivic saturation, clearly does, and situates MDM squarely on the rightmost side of figure. Hierarchical depth, a part of the feature list of the FMS, was not discussed as a separate component of the definition of MDM; this is because low hierarchical depth naturally results from the interaction of components 2 and 3, irregular pulse(s) and a motivically saturated surface. The analysis surrounding Example 1.18 highlighted the continually fluctuating nature of the metric hierarchy; although many pulses resided in the "extended" zone, it must be remembered that the less prototypical the pulse, the less likely it is to be recognized *as* a pulse; this fact is then compounded by the decreasing perceptual availability of slower pulses above the tactus level.¹⁰⁷ As

¹⁰⁷ By "tactus" I refer to what is also known as the "counting pulse," the pulse to which listener attention most readily gravitates. It is at the tactus pulse, I contend, that listeners tend to assess and make predictions of motive statement spans. If this process is conscious, we may call it "counting;" if subconscious, it may be more akin to Dehaene's "subitization." See Stanislas Dehaene, *The Number Sense: How the Mind Creates Mathematics* (New York; Oxford: Oxford University Press, 1997).

such, although there are in theory many pulses comprising the metric hierarchy of MDM passages, for the listener there are often far fewer. MDM requires two pulses (isochronous unit, irregular tactus) at minimum, and quite often there may not be any more than this if pulses in the extended zone are especially difficult; yet, as we have seen, as the zones expand, MDM can accommodate at least four pulses, though becoming increasingly less prototypical in the process.



Example 1.20. The FMS depicting the general location of prototypical Motive-Directed Meter

Given this formal definition of Motive-Directed Meter, as well as the Flexible Metric Space in which it is situated, I argue that treating MDM as metric enables insights that would not be attainable otherwise.¹⁰⁸ It is by now apparent that MDM engages the perceptual mechanics of prototypical meter to an extent sufficient to incite us to listen metrically, despite all of the non-prototypical features that create significant hurdles to doing so successfully.¹⁰⁹ The isochronous unit pulse is the most prototypical feature of all and, furthermore, it serves exactly the same function as it does in more traditionally metric musics. Although pulses slower than the periodic zone are non-prototypical, they are nevertheless conceptually recognizable as pulses; in this way, MDM continues to meet the requirements of familiar definitions of meter that necessitate a minimum of two distinct pulses.¹¹⁰ Recognizing that prototypical meter and prototypical MDM represent two distinct locations within the FMS, it is quite clear that certain movements away from one simultaneously represents motion towards the other. In this way, my analyses of MDM musics will engage the tension between those elements that are more or less normative, studying how individual passages manage the relative level of metric prototypicality and keep the feeling of meter continually in play, no matter the complexity or difficulty of the passage in question.

In order to fully understand the extent to which these different aspects of meter remain in play in practice, we need to be able to account for the experience of a listener actively engaged with real pieces of music. To this end, the next chapter introduces a set of analytic tools designed to describe the

¹⁰⁸ Richard Cohn makes a similar argument about treating hypermeter as if it were literally meter. Cohn, "Meter," 230.

¹⁰⁹ Martin Clayton makes a similar argument about how very little music fails to engage a sense of pulsation. Clayton, "Free Rhythm: Ethnomusicology and the Study of Music without Metre," 329.

¹¹⁰ Cohn, "Meter," 210.

See also Daphne Leong's concept of "modm-time." Daphne Leong, "A Theory of Time-Spaces for the Analysis of Twentieth-Century Music: Applications to the Music of Béla Bartók" (Eastman School of Music, 2000), 57-60.

phenomenon of Motive-Directed Meter as it arises in the course of the listening process. These tools revolve around the essential perceptual mechanics of motivic parallelism and metric inertia as described in Part I, and serve to model how listener expectations emerge and develop within specific manifestations of this singular metric phenomenon.

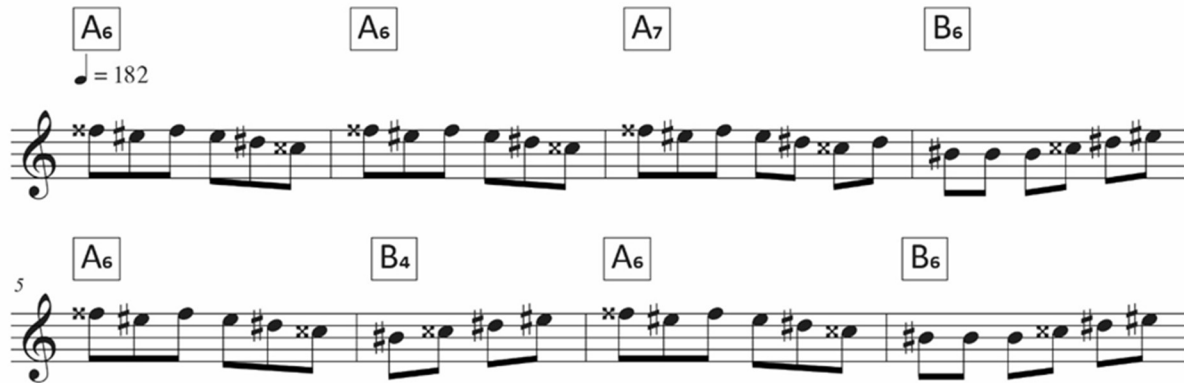
CHAPTER 2 | DEVELOPING AN ANALYTIC METHOD

This chapter introduces a set of techniques designed to uncover the mechanics of the Motive-Directed Meter (MDM) listening experience. These analytic tools are developed within the relatively controlled environment of the music of Igor Stravinsky, though they possess a wide general applicability to the music of other composers, time periods, and genres, as explored in Chapter 4. The techniques of this chapter are introduced by way of a series of analytic vignettes, each focused on a relatively brief passage extracted from its broader musical context. These short sketches present a series of unique problems, providing increasingly complex environments in which to introduce each analytic tool in turn. Chapter 3 then applies the methods developed here to large-scale works, exploring extended passages and entire movements of MDM, demonstrating the analytic payoffs to which these tools provide access.

I. TAKING OUR FIRST STEPS IN THE “RITUAL OF ABDUCTION”

Consider, as a point of departure, the brief passage presented in Example 2.1, which makes up Rehearsal 43 of the “Ritual of Abduction” scene from Stravinsky’s *Rite of Spring*. Although several sections of this particular scene have received analytic attention, R. 43 has not, to my knowledge, been studied from a rhythmic or metric viewpoint.¹ This may be due to its extreme brevity, for although vaguely sharing features with the material which precedes and follows it, R. 43 does stand out as notably distinct from its surrounding musical context. This makes the passage a perfect small-scale example to begin our analytic exploration of the MDM experience.

¹ Pieter C. van den Toorn, for example, analyses portions of Rs. 37, 40, and 46, which feature different musical materials. Pieter C. van den Toorn, *Stravinsky and the Rite of Spring: The Beginnings of a Musical Language* (Berkeley: University of California Press, 1987), 64-67.



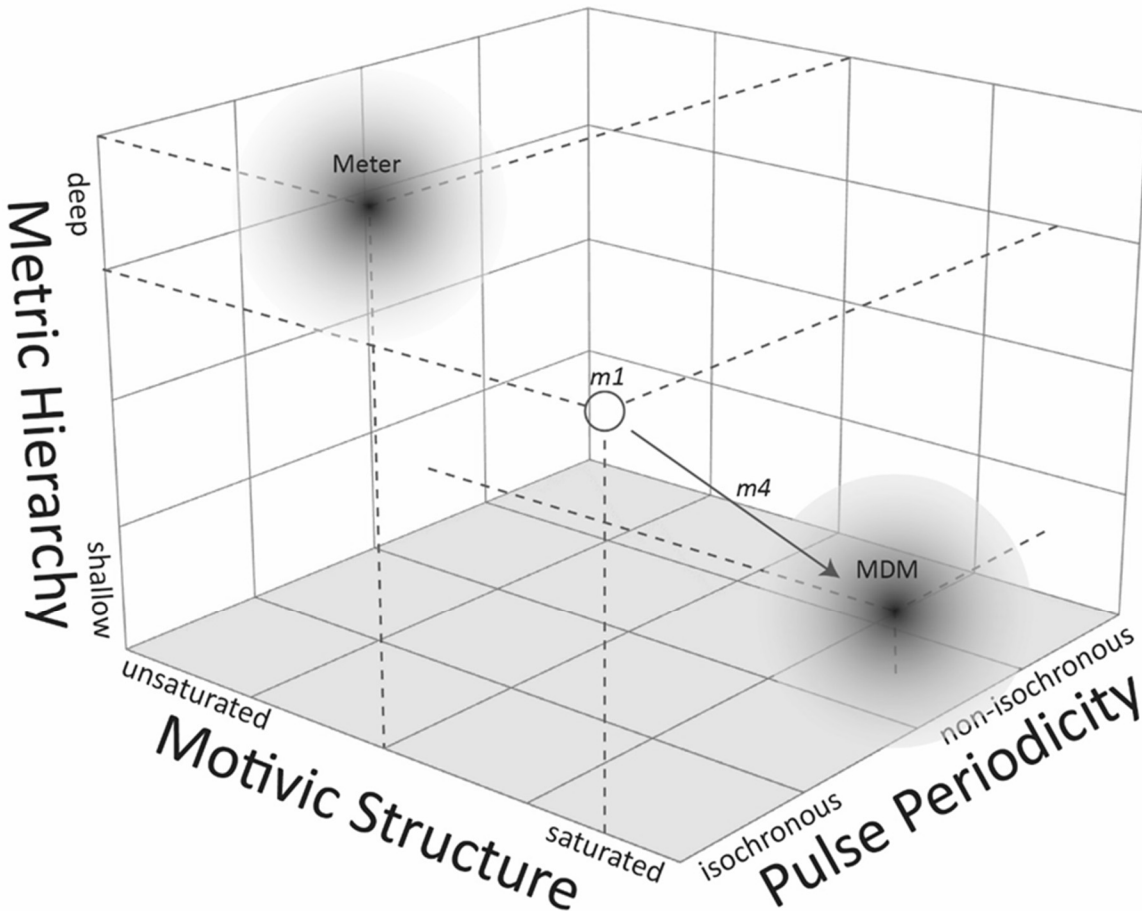
Example 2.1. A reduced passage from the “Ritual of Abduction” scene of Stravinsky’s *Rite of Spring* (Stravinsky, 2005)

First, it’s worth taking a moment to ensure that this brief passage conforms to the definitions of Motive-Directed Meter as set forth in Chapter 1. Four essential criteria were established there: 1) an isochronous unit pulse; 2) irregular slower pulses; 3) a small number of motivic ideas; and 4) a generally homophonic texture. First, although it can’t be seen in the reduced notation, the passage is wholly homophonic. Second, the notated eighth note serves as the invariant unit pulse that undergirds the brief section, serving as a stable reference point against which all slower pulses may be counted. It is furthermore instantiated throughout by note onsets, making its presence inescapable. Third, adhering for the time being to Stravinsky’s notated barlines, it’s quite clear that durational spans change at a rapid pace throughout R. 43, producing fluctuating pulses above the unit pulse.² In fact, the second notated measure of this excerpt is the only bar to repeat the span articulated by its predecessor.³ Example 2.2 returns to the Flexible Metric Space introduced in Chapter 1 to indicate how the passage begins with relatively prototypical metrical structure, and only moves to evoke Motive-Directed Meter upon the arrival of the fourth notated downbeat. This instant confirms the altered duration of m. 3,

² Spans of each motive statement are indicated with subscript Arabic numerals in the boxes above the staff.

³ I return to consider the meaning of Stravinsky’s barlines below, as well as the ramifications of re-barring his music.

simultaneously creating an irregular pulse and significantly lowering the depth of the entrained metric hierarchy, as represented by the arrow in Example 2.2.



Example 2.2. The FMS depicting the temporal progression to prototypical MDM in the “Ritual of Abduction” passage

Fourth and finally, evaluating whether R. 43 adheres to the requirement of a “small number of motives,” the passage must be parsed into discrete units on the basis of evident surface-level rhythmic and melodic differences. When analyzing motivic content I use a naming convention employed by Boulez, van den Toorn, and others, in which motives are first identified by capital letter—issued to unique motives in order of their initial appearance—beginning with “A” and proceeding through the alphabet, and are identified second by numeric subscript denoting the total length of that motive

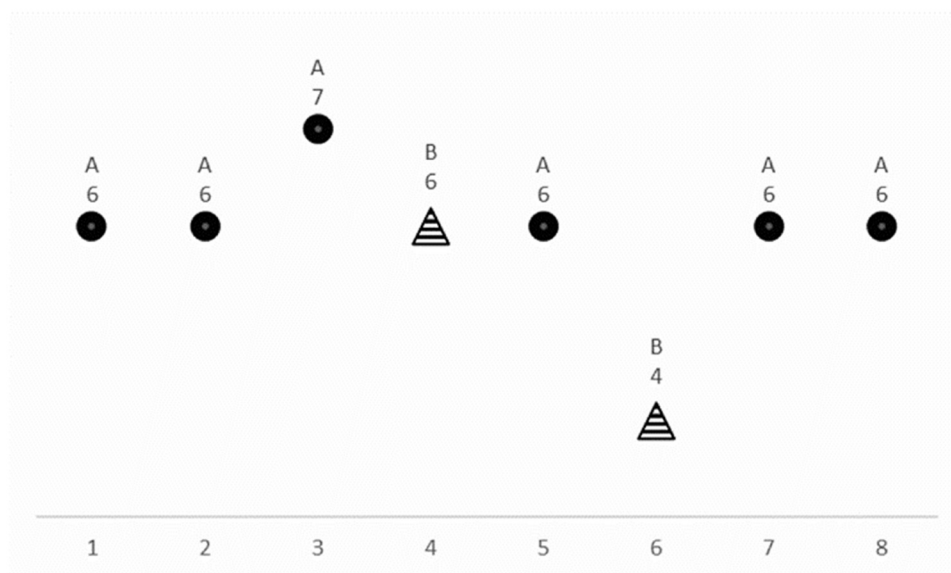
statement, usually counted relative to the unit pulse.⁴ The former represents an interpretive step in which the analyst must make ascriptions of sameness and difference; this is simple enough when motives are clearly distinct, yet—as we will see—parsing can become ambiguous when the motives of a passage are only subtly differentiated. Such multivalent cases present interpretative opportunities to consider the same passage under different listening schemes and tease out the consequences of contrasting metric experiences. The latter ascriptional step (numeric subscript) is typically more automatic and self-evident, though variations can create uncertain boundary points between motive statements, even in cases of clear motivic identity. Changes to the span of a motive statement change only the Arabic subscript of a label, while variations of the motive that create more substantive changes—while still preserving an underlying sense of motivic identity—result in one or more prime symbols being placed after the motive’s letter label. We will see several examples of such variation in the analysis of the “Evocation of the Ancestors” analysis in Part IV below.

Applying this naming convention to the “Ritual of Abduction,” we arrive at a bipartite motivic structure. Two motives, which we’ll call “A” and “B,” are differentiated primarily by contrasting contour: motive A is made up of mostly stepwise descending motion, while B expresses stepwise ascent. Each instance of A is also initiated with an identical “lower neighbor” gesture. Furthermore, each of our two motives begins with a pitch at the boundary of the pitch spectrum employed in this passage (F double-sharp for A, B sharp for B), tones exclusive to the motives in which they appear. For these reasons, and despite the lack of surface-level rhythmic variety between motives, I consider motivic identity in this passage unambiguous. Having made determinations of motivic identity, ascriptions of motive statement lengths follow automatically, as summarized in Example 2.3. We’ve now arrived at a reasonable parsing of R. 43 into discrete motives, and have begun to consider the durational structure of the passage. So

⁴ See, for example, Pierre Boulez, *Notes of an Apprenticeship*, trans. Herbert Weinstock (New York: Alfred A. Knopf, 1968), 62.

See also Pieter C. van den Toorn, “Stravinsky Re-Barred,” *Music Analysis* 7, no. 2 (1988): 186.

far, this all seems pretty top-down in conception; motivic parsing required us to step back from the musical surface and look for commonalities across bars separated by intervening materials in an atemporal fashion. We can reduce the atemporality of this process in a number of ways; first, let's look the actual sequence of motives as it unfolds in time, as given in Example 2.3, and consider whether the above motivic parsing is likely to arise as a listening experience unfolds in real time. Thankfully, the particular sequence of materials provides the listener time to digest the profile of each motive and recognize the distinctive features of each in turn. Motive A repeats three times in succession to initiate the passage; such repetition underscores the boundaries of that which is repeated, thereby serving to “thingify” the repeated element.⁵ By the time motive B arrives in m. 4, A—although altered in m. 3—will be sufficiently “thingified” so that the distinct features of B will be instantly evident. B is never treated to the same kind of direct repetition, but now it doesn't need to be; given the familiarity of A and the lack of other competing materials or motives with ambiguously similar profiles, B can at the very least maintain an identity of “not A.” Yet as we've seen, B also has a distinctive melodic profile.



Example 2.3. A motive map for the “Ritual of Abduction” passage

⁵ Elizabeth Hellmuth Margulis, *On Repeat: How Music Plays the Mind* (Oxford; New York: Oxford University Press, 2014), 43.

We've tabulated the span of each motive statement in terms of total number of unit pulse onsets, but there remains much to be said about the internal metric structure of these statements, the great majority of which are 6-units (spans of 6 unit pulse onsets). In particular, we haven't yet considered the intermediate pulse between the unit—the notated eighth—and this arrival pulse level, marked by the notated barlines. Let's begin with the A_6 statement that initiates the passage. The repetition of the (F double-sharp, E sharp) pitch set that initiates the motive statement, paired with our innate duple bias, strongly suggests a (222) intermediate pulse. Yet at first glance, a (33) pulse would seem to fit quite well; the first triple group would comprise a lower neighbor note figure departing from F double-sharp, while the second would begin with the initiation of a descending stepwise gesture beginning on E sharp. Temporarily ignoring the anomalous A_7 statement, let's consider the other 6-unit statement, B_6 , which occurs twice in this passage. The intermediate pulse of B_6 is even more ambiguous than that of A_6 ; a (33) hearing would create an initial group comprised entirely of the lower boundary pitch B sharp, and a second consisting of a stepwise ascending line starting with C double-sharp. Conversely, a (222) hearing is supported by duple bias, and creates an initial group of two B sharps followed by a four-note ascending line beginning on that same pitch. Further complicating matters is the inversive relationship of our two 6-unit statements. B_6 is A_6 with two transformations: the pitch contour is first inverted, and the neighbor note gesture on the second timepoint of A_6 is replaced with a repetition of the would-be ornamented pitch (B sharp in B_6).

This ambiguity of the intermediate pulse level will, I believe, remain a latent component of the listening experience, even after many hearings. Yet I think a listener may well settle into a stable entrainment pattern as a result of the context in which these motives appear in real time. This section, R. 43, is preceded by 15 instances of (3) at this intermediate pulse level (notated mm. 22-28); (3) will therefore be firmly entrenched in one's ear upon the arrival of the first A_6 instance, the power of metric inertia overriding any potential bias toward (222) above. B_6 , on the other hand, occurs immediately

following the sole A₇ statement; let's pause to consider the internal metric structure of this statement so that we might better understand its effects on the following B₆ statement. A₇ arises clearly from a simple variation: the addition of a single D sharp eighth note at the end of the familiar and more common A₆ form. Our present concern is with the pulse slower than—and immediately adjacent to—the unit pulse. Since, given the model of meter introduced in Chapter 1, the period of a non-isochronous pulse must be a combination of 2 and 3 times the adjacent faster level, this single timepoint cannot exist on its own, creating a (331) pulse level.⁶ Rather, this additional note must be somehow merged into the existent pulse structure, upon which it can't help but leave an indelible imprint.

Building upon William Rothstein's distinction between "internal" and "external" phrase expansions, Gretchen Horlacher makes an important distinction concerning the location in which melodic variations occur:⁷

Some variations elongate a melody internally, while others may change its degree of closure. This distinction is critical because *within* defined boundaries a variation may be perceived as stretching, compression, or elision, within the melody's confines; a change to its end, however, may be perceived as a reconception of the melody as a whole, a surprise that has ramifications for subsequent reiterations.⁸

We will consider the effects of A₇ on subsequent statements of A₆ below. Transposing Horlacher's ideas about melodic variation to the smaller-scale level of the motive, we might ask to what extent the additional final appended note of A₇ effects one's metric understanding of motive A. Some type of expansion is clearly taking place, but how does it play out experientially? Only retrospectively, I argue, for a first-time listener has no way to predict this addition, occurring as it does at the very end of the

⁶ See the discussion of pulse periodicity in Chapter 1.

Given a different model of meter, other relations between pulses might be possible; (34), for example, would be a plausible transformation of the (331) described here.

⁷ William Rothstein, *Phrase Rhythm in Tonal Music* (New York: Schirmer Books, 1989), 68.

⁸ Gretchen Horlacher, *Building Blocks: Repetition and Continuity in the Music of Igor Stravinsky* (Oxford; New York: Oxford University Press, 2011), 80.

motive at the exact moment that the arrival of a new statement (another instance of A_6 , in all likelihood) will be anticipated.⁹ Once we recognize the onset of B as an arrival, something like (331) may well be the initial impression for A_7 , though this does not make a well-formed metric structure; some degree of retrospective reinterpretation must therefore intervene and re-contextualize the metric organization of the passage just experienced. Given the clear bipartite (33) nature of A_6 , it seems most probable that this final added note will affect only the latter half of A, the final 3-unit. The normative operations of metric structure adopted in this dissertation allow this to happen in one way only: that second (3) unit grows by one, and is then split into two equal units—(22)—thereby creating a final intermediate felt pulse for A_7 : (322).

Does this change effect, in Horlacher's terms, a "reconception of the melody as a whole"? It certainly might affect a listener's expectations upon recognizing future instances of A beginning; we will see how to model this shift and its consequences later on. At the very least, it produces three effects. First, and most obviously, it transforms the metric profile of A itself by elevating an event—the onset of C double-sharp—up an entire pulse level, from the unit pulse to the intermediate pulse (notated quarter note), creating, in the process, the first tripartite division of the A motive (the tripartite (222) division being only a latent possibility in the preceding statements of A_6 , as discussed above). Second, the transformation introduces uncertainty into the musical experience for the first time. Without it, the first and only substantive metric change would be the B_4 of m. 6; the passage would be so metrically stable that it would hardly meet the irregular pulse requirement of MDM. A_7 is, in a word, the "kickoff" event of MDM, as shown in Example 2.2, unceremoniously alerting a listener that the metric stability of mm. 1-2—as well as the preceding stable measures of (33) described above—will not persist, but that they must begin listening with the level of attention necessitated by the MDM experience. Third, and

⁹ Elizabeth Margulis discusses how repetition can signal both continued repetition as well as change. See Margulis, *On Repeat*, 24.

relatedly, A_7 , by transforming the meter of this particular statement of A , disrupts and changes the metric inertia which had gone unchallenged for many bars prior; this brings us finally back to our consideration of the internal metric structure of the ambiguous B_6 .

We noted that the potential ambiguity of A_6 is largely “resolved” by the context in which it appears—specifically, the unbroken dotted-quarter pulse that precedes the material notated in Example 2.1. Now that we’ve established that A_7 consists of a (322) sequence, it seems clear that the final incipient half-note pulse must have some effect on one’s hearing of the subsequent B_6 , if only latently. In my experience, the inertia produced by that final (22) pair of A_7 does carry forward and cause me to hear B_6 as (222). There is another possible reason for this; that of my own veridical expectancy based on my familiarity with the piece and those events which have yet to transpire once B_6 is first reached—specifically, the B_4 of m. 6.¹⁰ This shortened version of B cannot help but express a (22) intermediate pulse—at least retrospectively—and this has implications for one’s understanding of the B motive as a whole. If the metric inertia produced by the (22) ending of A_7 was not enough, it seems to me that the (22) of B_4 will be sufficient to strongly encourage hearing the final B_6 of m. 8 with a (222) intermediate pulse.

Having now clarified several of the preliminary elements, we have arrived at a basic understanding of this brief passage, its constituent motivic units, their varied forms as they appear in succession, and a reasonable metric hearing of each in turn. We are now prepared to introduce the first simple analytic tool we will bring to bear on MDM musics, which considers a rough estimate of metric “stability” to arrive at a general sense of the relative difficulty of each metric-motivic unit across a given passage. The Flexible Metric Space is used to evaluate the stability and predictability of musical passages

¹⁰ For more on veridical knowledge and musical expectancy, see Martin Rohrmeier, “Musical Expectancy: Bridging Music Theory, Cognitive and Computational Approaches,” *Zeitschrift der Gesellschaft für Musiktheorie* 10, no. 2 (2013): 351-52. See also David Huron’s discussion of schematic and veridical expectations. David Huron, *Sweet Anticipation: Music and the Psychology of Expectation* (Cambridge, MA: MIT Press, 2006), 224-26.

according to three criteria: 1) pulse periodicity; 2) hierarchic depth; and 3) motivic saturation.¹¹ When evaluating abstract metric structures in the absence of musical material, we cannot consider the motivic structure. We can, however, extract and simplify the first two features into a numeric system that will offer a rough-and-ready evaluation of the entrainment difficulty of a given metric structure in isolation. This method does not consider context, but merely considers abstract entrainment difficulty of a metric pattern, all other things being equal. First, considering the sum total of all sounding pulse periodicities, I arrange metric hierarchies into one of four categories, as detailed in Example 2.4. Pure duple and “Kirnberger meters” are both isochronous throughout, and therefore the most stable of all; pure duple structures have the added benefit of conforming to binary preference and of expressing invariant (duple) relations between all adjacent pulses.¹² So-called “odd” meters maintain isochrony at the crucial level of the tactus, though the next-slower pulse is no longer isochronous. For maximally unstable “irregular” meters, even the tactus is no longer isochronous. Ranking these metric categories numerically, we arrive at a metric “variability index” (VI) which ranges from 1 to 4, with higher numbered meters being, in the abstract, more difficult to entrain than lower.

VI	Meter Category	Description	Examples
1	Pure Duple	All pulse relations duple	(22); ((22)(22))
2	Kirnberger	All pulse relations duple or triple	(222); (33); (333)
3	Odd	Slower non-isochronous pulse adjacent to the tactus	((222)(22)); ((33)(33)(33))
4	Irregular	Non-isochronous tactus	(23); ((32)(22)); ((223)(22))

Example 2.4. The metric variability index (VI), indicating the relative stability and predictability of four categories of metric organization

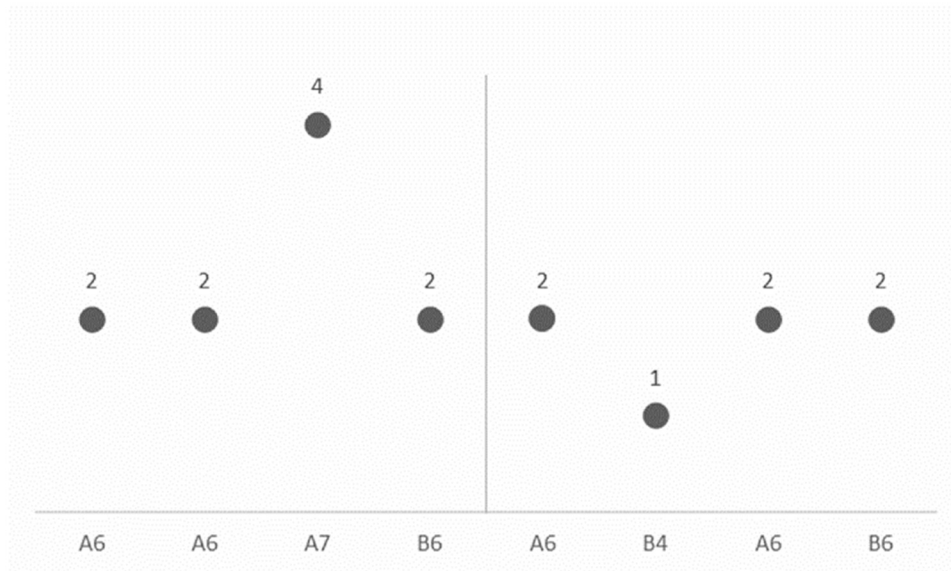
¹¹ See Chapter 1, Part III.

¹² The span of a “pure duple” meter is a power of two. The relations between all pulses must also be duple. See Richard Cohn, “The Dramatization of Hypermetric Conflicts in the Scherzo of Beethoven’s Ninth Symphony,” *19th-Century Music* 15, no. 3 (Spring, 1992): 194.

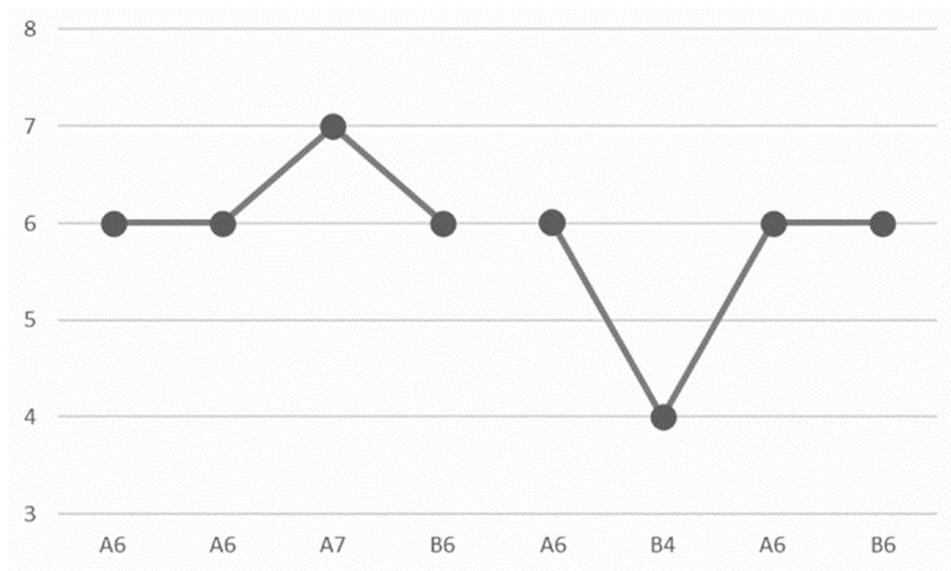
“Kirnberger meters” are named after Johann Kirnberger (1721-1783), who enumerated a standard set of meters built of sets of two, three, and four “beats.” This list includes the great majority of commonly used meter signatures. Johann Philipp Kirnberger, *The Art of Strict Musical Composition*, trans. David Beach and Jurgen Thym (New Haven; London: Yale University Press, 1982), 383-85.

Second, we can approach the hierarchic depth of a metric unit in a roundabout way by considering its total durational span. But are longer durational spans more stable and predictable or less so? From a perceptual standpoint the answer would clearly seem to be the former, as successful entrainment of longer durational spans bestows greater predictive power than does entrainment of shorter durations. Consider, for example, the meters (2222) and (22). All other things being equal—assuming nothing about “hypermetric” organization, for instance—successful entrainment of (2222) enables the listener to make accurate predictions about twice the temporal span as does entrainment of (22). This general rule does seem applicable to meters on the low end of the VI scale established in Example 2.4—pure duple meters in particular, as well as “Kirnberger” meters—but does not hold when we move into more complex types of metric structures. Because of the variance that occurs within the non-isochronous pulses of VI 3 and 4 meters, the specific pattern of “long” and “short” elements must first be learned, and then repeated, at each return of the metric unit. Clearly the VI 4 (2332322) meter is much more complex—and therefore less perceptually stable—than the shorter and simpler (23) meter, also VI 4. Metric length therefore tells us comparatively little on its own, as it exhibits opposing tendencies at opposite ends of the variability index spectrum: longer spans are more stable in low VI meters, and less stable in meters of high VI. Yet when considered in conjunction with the variability index, total span allows us to make more precise evaluations of the complexity of specific meters than does VI in isolation.

Graphs of variability index and durational span for the “Ritual of Abduction” passage are given in Examples 2.5a and 2.5b, respectively. Considering both together, we see something rather uncommon: metric stability and metric length are roughly correlated in this passage. Motive statements with a span of 6 and VI of 2 (this includes both A_6 (33) and B_6 (222)) are the uncontested normative state; the one deviation to a less stable meter (A_7 (223)) is also marked by a span increase—further heightening the relative instability—while the meter that is the most stable on its own (the VI 1 B_4 (22))



Example 2.5a. variability index values for the “Ritual of Abduction” passage



Example 2.5b. Motive statement lengths in the “Ritual of Abduction” passage

represents the only moment of span reduction. But of course, since span reduction marks *reduced* stability in VI 1 meters, as discussed above, this span change is also reduction of stability. For me, this 8-bar passage divides neatly into two 4-bar sub-phrases as a result of three primary factors: first, duple bias, which suggests duple groups of motive statements and duple groupings of those groups; second,

the logical pairing of motives produced by that duple hierarchy (((AA)(AB))((AB)(AB))), which is nearly consistent throughout; and third, by the sense of “return” effected by reprise of A₆ at the start of the second half, arriving as it does after the first “departure” to the B motive of m. 4. The vertical line in Example 2.5a shows this two-part structure, providing a clearer picture of the overall flow of metric complexity and stability across this passage: each sub-phrase is marked by a single deviation from the normative VI 2, 6-unit state.

We may well wonder at the experiential consequence of the changed location of the deviation: the third bar of the first sub-phrase, as opposed to the second bar of the second sub-phrase. In the first sub-phrase the first two stable bars serve the important function noted above of establishing a state of stability and a set of expectations that m. 3 serves to disrupt; the disruption is all the more effective because of the expectations it violates. Measure 4 then continues the disruption—albeit in a quite different fashion—by introducing new motivic materials and a new (222) intermediate pulse. Since the A₆ of m. 5 that initiates the second sub-phrase functions as a kind of “return,” it brings with it all of the associations created in mm. 1-2, as well as the metric profile established in those measures.¹³ Less time is therefore required to establish entrainment, and the interruption can arrive one bar earlier in this sub-phrase, in m. 6 rather than 7. As a result, more time now exists at the end of the second sub-phrase to reestablish metric stability. This is indeed what we find: the final motive pair, A₆B₆, gives us a level of stability ((33)(222)) second only to that of the passage’s A₆A₆ opening bars ((33)(33)). In a way, this final motive pair is what we’ve been “waiting for” this entire time; A₆A₆ was missing the crucial B motive, A₇B₆ featured a non-standard A statement, and A₆B₄ a non-standard B statement. The final A₆B₆ brings together the opposite (33) and (222) elements that were found latent in both motives and holds them together in an uneasy juxtaposition, providing tentative closure to this brief section.

¹³ See Chapter 1, Part I for more on the relationship between motive and accompanying metric profile.

The pairing of variability index and durational span, as in Example 2.5, is still somewhat structuralist in approach; it is listener-oriented, but not particularly processual. The next tool we'll use begins to address this by focusing on the connections *between* meters rather than on the complexity of each meter in isolation. This second device is a simplified version of the system put forth by Mark Gotham for the comparison of so-called "mixed metrical structures." Gotham defines a set of "relations" that hold between any two meters and puts them forth in a taxonomy; his purpose is theoretical, serving to enumerate all possible relations of this kind, though certain relations, he admits, are rarely significant.¹⁴ I find six of his 12 relations relevant for the analysis of MDM musics; let's consider each in turn.

First, a note on Gotham's terminology: he introduces the term "meter vector," which "presents two numbers in curly brackets to designate the number of duple and triple beats respectively."¹⁵ This is a method of describing the unordered pulse content of a meter at the tactus level. A (223) meter would express a meter vector of (2,1), indicating the presence of two "duple beats" and one "triple beat." The first of Gotham's relevant metric relations is the "Identity" (I) relation, which simply describes meters with identical pulses and total durational span; I is used to indicate the absence of a metric change, moments of relative stability in MDM contexts. The next relation is "Sub-Tactus Pulse Cardinality" (P), which holds among meters with the same span, regardless of internal metric structure.¹⁶ We have seen an example of this already: in the "Ritual of Abduction" passage, A₆ and B₆ are related by P, since both are 6-units, though the intermediate pulse is (33) in the former and (222) in the latter. The third relevant relation is that of "Beat Cardinality" (B), in which "Meters have the same number of units at the

¹⁴ Mark Gotham, "Meter Metrics: Characterizing Relationships among (Mixed) Metrical Structures," *Music Theory Online* 21, no. 2 (2015): 8.1.

¹⁵ *Ibid.*, 2.6.

¹⁶ *Ibid.*, 8.1.

counting or tactus level.”¹⁷ It does not matter, for the B relation, the size of each intermediate span—whether duple or triple—since B is a somewhat loose relation that considers cardinality alone. As a result of its generality, B is quite common. In fact, nearly every other relation in R. 43 besides the P relations noted above are B relations. In A₇, the intermediate pulse (322) articulates 3 timepoints, as does the B₆ statement (222) it precedes; connections between A₆ (33) and B₄ (22) are also B relations. If we wish to be more specific, we can refer to the Gotham’s “Vector Identity” (V) relation, in which “Meters have the same number of each beat type but may differ in other respects such as beat ordering and higher-level grouping.”¹⁸ By this, Gotham means that the meters share identical numbers of both “2s” and “3s,” as in (2332) and (2233). As Gotham notes, V entails B; that is, any meters with the same meter vector must necessarily also have the same number of units at the tactus level—V is a special case of B. There are no cases of V in R. 43.

So far, we have considered relations which maintain one metric element invariant: the total span in P, the number of tactus timepoints in B and V, and also number of tactus pulse onsets for each type (“duple” and “triple”) in V. The final two of Gotham’s relevant relations do not retain an invariant element, but express a relation of sub- and/or super-ordination, wherein one meter is a subset of the other. The first, more general such relation, is the “Unordered Sub-/Super-Set” (U), in which “One meter has fewer of one beat type than the other, and a lesser or equal number of the other beat type.”¹⁹ The second, more specific relation is “Non-Saturated Order Relations” (O), wherein a “Longer meter’s pattern contains within it the pattern of the shorter...”²⁰ As V entailed B, so does O entail U. There are no adjacent examples of the U or O relations in our R. 43 passage, but the meter of B₄ (22) is clearly an

¹⁷ Ibid.

¹⁸ Ibid.

¹⁹ Ibid.

²⁰ Ibid.

ordered subset (O relation) of that of B_6 (222), though it is impossible to specify the location of the subset within the superset given the single beat type (duple).

Example 2.6 shows the sequence of relations that hold between adjacent meters in the “Ritual of Abduction” excerpt from Example 2.1. The information captured here provides us with a much different perspective than that of our VI stability metric; whereas the former focused on meters as individual standalone entities, Gotham’s relations invite us to consider the connections between meters and the kinds of processes that join adjacent metric structures together. Gotham hesitates to make relative judgements of importance about the relations, noting that “Those decisions are too contextually contingent to be generalizable, and are much better left to the analyst.”²¹ I agree with Gotham’s assessment; there is no reliable way to determine, in the abstract, which relations are more or less significant, impactful, or difficult for a listener. For our experiential perspective, relations provide us with information about invariance and similarity, allowing us to see which metric elements remain stable points of perceptual grounding. Patterns of relations may create sets of expectations regarding future relations, and relations that stand out from their contexts are likely to produce less predictable results. We learn from Example 2.6, for example, that P and B—our invariant relations—are typical across this excerpt, occurring 2 and 3 times, respectively, while the A_6 (33) of m. 2 and A_7 (322) of m. 3 are connected by no relation whatsoever.²² Although I make no determination here about the relative entrainment difficulty of P and B, it seems clear that, by maintaining one metric element—span and tactus onsets, respectively—both provide a perceptual advantage over no relation at all. Measure 3 therefore stands out as the most metrically difficult moment of the entire passage; we noted already in

²¹ Ibid., 8.4.

²² For Gotham, this would be an example of the “Partial grouping commonality (G)” relation, which he notes is “Rarely of statistical significance.” I consider all cases in which one of the 5 relations described above do not apply to have no relation, though readers familiar with Gotham’s work may note the relations he would have observed therein. Ibid., 3.4.

Example 2.5 that this A₇ statement was uniquely metrically unstable in this excerpt, a condition underscored by its greater total span than all other motive forms. That observation considered m. 3 on its own in atemporal relation to other motive statements. Example 2.6 now suggests that, additionally, m. 3 arrives in a real-time listening experience in an unexpected manner because of its lack of clear metric relation to the metric structures that preceded it; this is of course only compounded by the fact that a first-time listener would at this point not yet be prepared for an MDM context at all.



Example 2.6. The sequence of Gotham's metric relations in the "Ritual of Abduction" passage

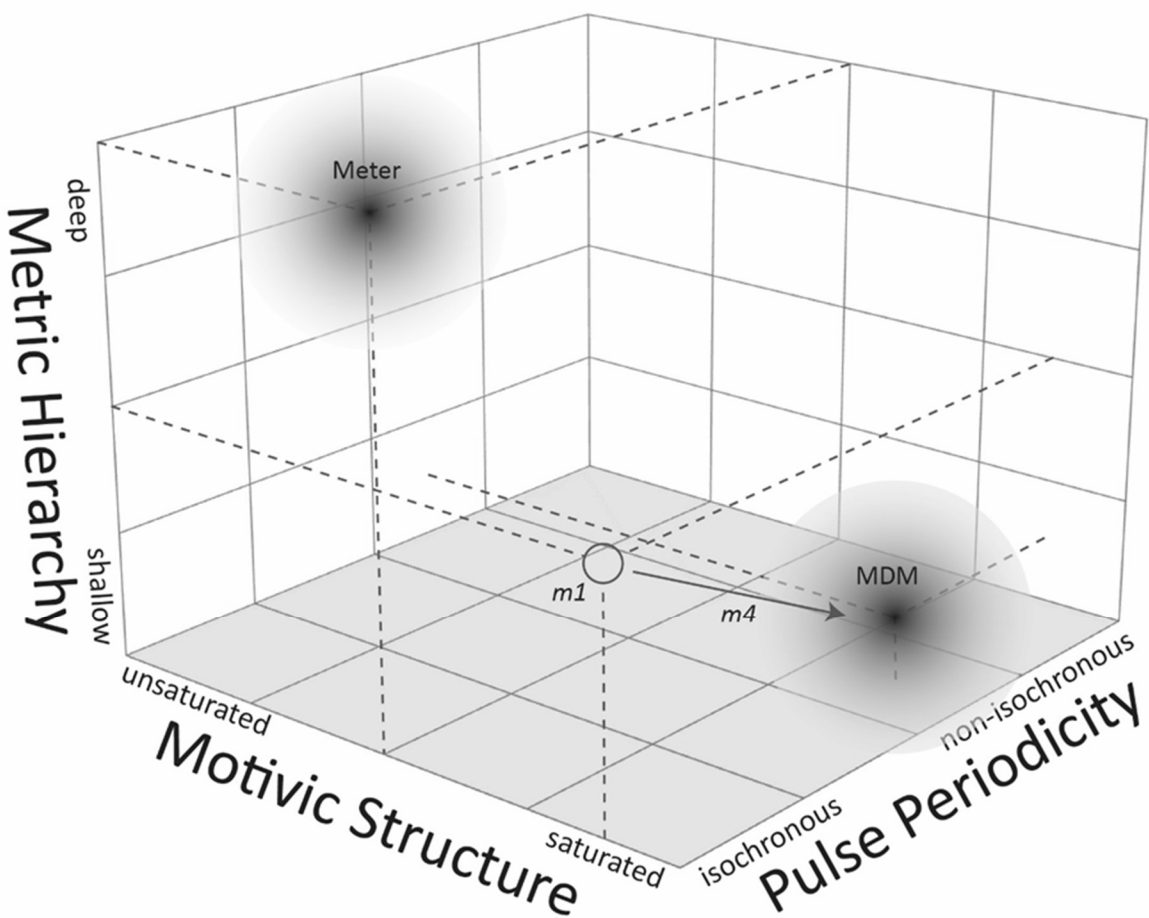
We now have some basic tools that enable us to approximate the relative complexity—and, to some extent, the entrainment difficulty—of each metric/motivic event within an MDM passage. A consideration of the internal structure of each meter, employing both metric complexity in the form of the variability index and metric length, provides one component, while the connections between these meters—as expressed by Gotham's metric relations—help to further fill in the picture. Although relations are more processual in design than VI calculations, they still don't quite capture the experience of a listener as they move through a passage of MDM in real time. The next section introduces a new set of tools that shift our analyses towards this more phenomenological orientation.

II. ASSESSING METRIC DISPLACEMENT IN THE "DEVIL'S DANCE"

We see, in Example 2.7, a brief passage extracted from the "Devil's Dance" scene of Stravinsky's *Soldier's Tale*. As with the "Ritual of Abduction," the metric progression is plotted within the FMS, shown in Example 2.8; and, like that earlier excerpt, it charts a shift from largely prototypical meter to a state of Motive-Directed Meter. This excerpt is marked by 9 bars of fairly homogenous materials: a



Example 2.7. A reduced passage from the “Devil’s Dance” scene of Stravinsky’s *Soldier’s Tale* (Stravinsky, 1995)



Example 2.8. The FMS depicting the temporal progression to prototypical MDM in the “Devil’s Dance” passage

constant eighth-note unit pulse runs throughout, articulated by quarter and dotted-quarter notes, marked by sequences of near-invariant pitch content. As a result of this similarity of content, the motivic materials are underdetermined; this underdetermination has the potential to result in ambiguous motive identities and boundaries. I see two plausible options: either a single A motive runs throughout the passage, or two separate A and B motives coexist in irregular alternation. In the latter case, A would comprise motive statements 1 and 3, and B the remaining statements (in the former case, we would instead call B “A”). The two would be differentiated by the changes in instrumentation, register, and pitch content that distinguish these statements, as well as the presence or absence of a running-eighth chromatic line in the hypothesized B measures (not notated in this reduction).

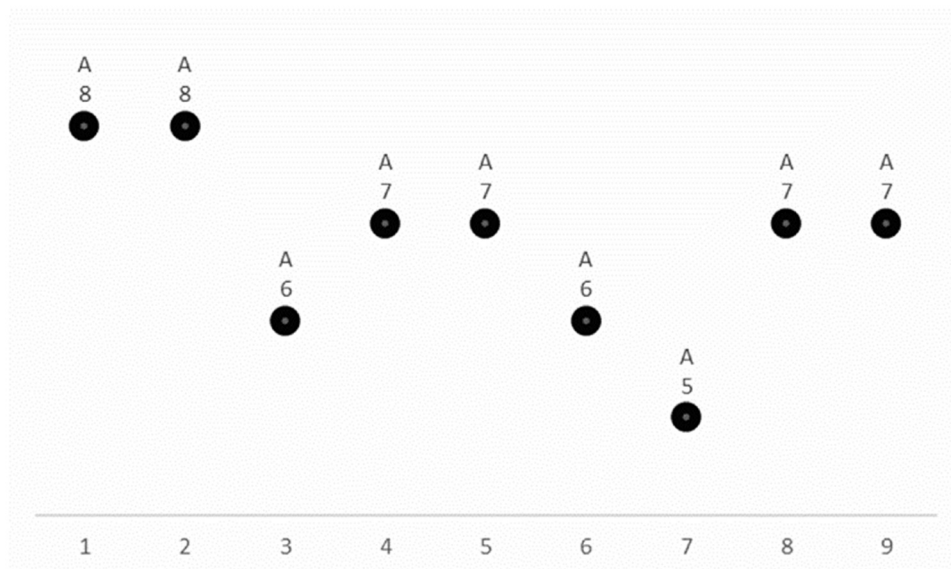
Although these combined differences are significant, I personally gravitate towards hearing the same recurring A motive, albeit subjected to some degree of variation upon nearly every occurrence. I am convinced primarily by the underdetermined nature of A itself; the motive has—at least in its initial few presentations—no internally definable beginning or ending points. Instead, motivic variation of the kind seen across statements 1-4 performs the work of creating motivic boundaries. Were it not for the changes of register, etc. described above, these bars would be a motivically undifferentiated sequence, and pulses slower than the quarter note could only arise as a result of subjective metricization. In short, motive A requires continual variation in order to be recognizable as a recurring motive at all. And given the significant similarities that remain after said variations between A and A'/B, hard boundaries between the two seem less likely.

But we need not settle this ambiguity here. After all, we have seen that a multiplicity of listening strategies is a hallmark of Motive-Directed Meter; instead of attempting to conclusively decide which motivic organization scheme is more likely, let's explore what might occur under each approach. We begin with the unitary motivic conceptualization, referred to hereafter as “A/A'.” Let's consider the durational transformations to which our single A motive is subjected. This entity appears in four metric

versions, as summarized in Example 2.9, which shows the internal grouping structure of each motive form. Duple groupings of the unit pulse are clearly predominant throughout, while the odd-cardinality A_7 (223) and A_5 (23) feature terminal triple groupings only as necessary to maintain motivic parallelism. A map of these motive statements is given in Example 2.10. Uniquely, the final statement is very

Motive Form	Intermediate Pulse	Measures
A8	2222	1, 2, (9)
A6	222	3, 6, (9)
A7	223	4, 5, 8, (9)
A5	23	7, (9)

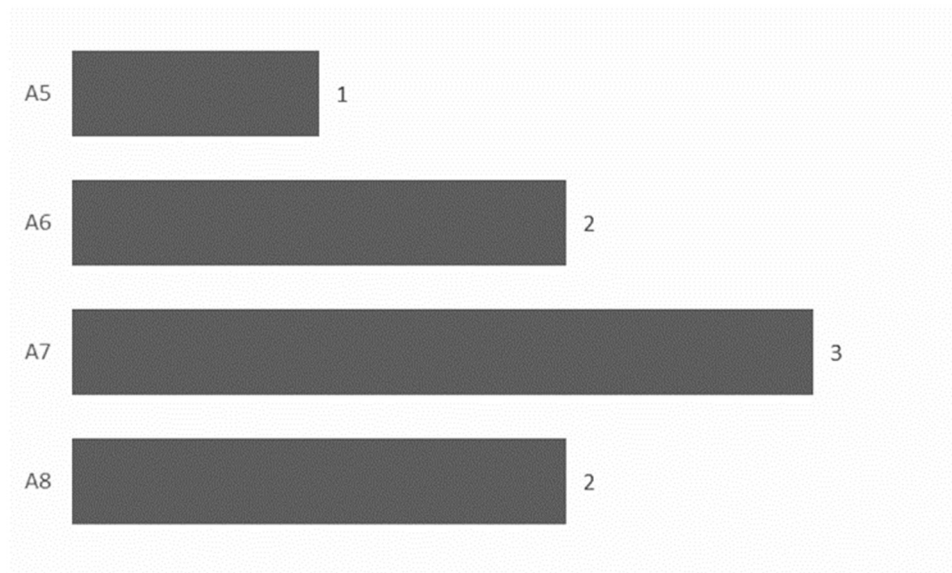
Example 2.9. Motive forms in the “Devil’s Dance” passage



Example 2.10. A motive map for the “Devil’s Dance” passage

ambiguous, as there is no clear final arrival point to signal the end of statement 9. I believe all four motive forms are potentially hearable in this final bar—dashed barlines in Example 2.7 show these hypothesized versions of statement 9. We will see below that, in context, certain forms are more plausible than others. Example 2.11 then provides the end-state distribution of motive forms across the passage, excluding statement 9; simply add 1 cardinality to any of the four forms to see the distribution

given that version of statement 9. This graph shows a slight overall tendency toward A₇ (223), though hearing statement 9 as A₆ (222) or A₈ (2222) would put the corresponding motive form on an even frequency with A₇ (223).



Example 2.11. The distribution of motive forms in the “Devil’s Dance” passage

Gotham’s metric relations are very useful for assessing types of connection between adjacent meters, but as noted previously, they provide no means for comparison of relative difficulty or stability. Furthermore, they are content-neutral; under both hypothesized motive systems outlined above, the metric relations are identical. We need a method that can compare contrasting approaches to the “same” musical passage; to this end, I introduce a new technique designed to assess the degree of mismatch between metric expectations and the realizations of the musical surface. To do this, I build upon the metric foundation provided by Fred Lerdahl and Ray Jackendoff in which musical meter is represented as a series of timepoints and pulses are depicted as rows of timepoints, as discussed in Chapter 1.²³ Utilizing this system, the total number of pulse levels instantiated at any given timepoint

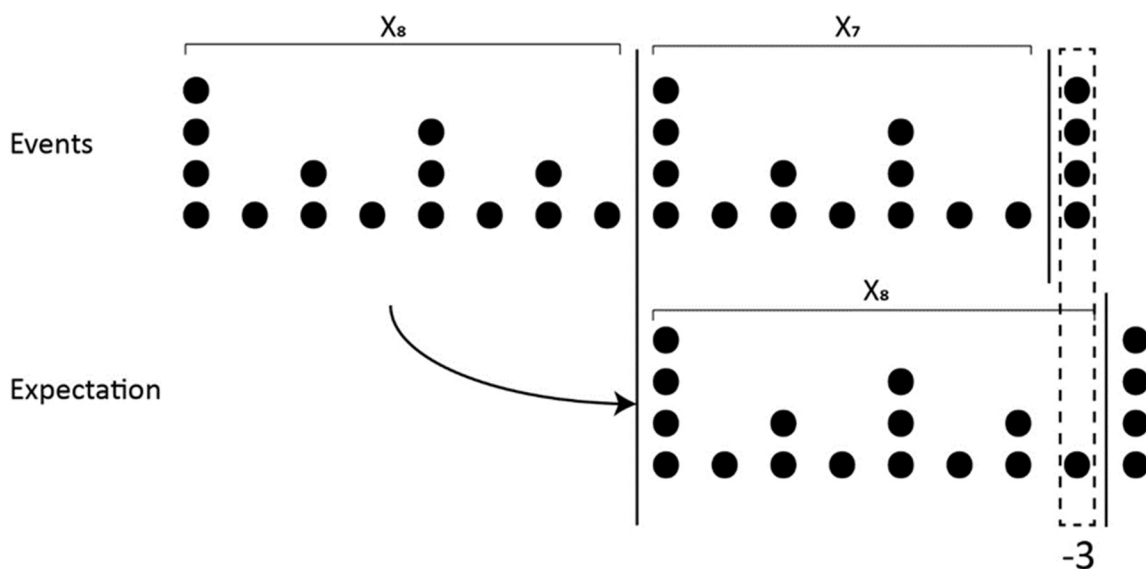
²³ Fred Lerdahl and Ray Jackendoff, *A Generative Theory of Tonal Music* (Cambridge, MA: MIT Press, 1983).

indicates the felt metric strength of that moment, hereafter referred to as “metric depth,” or simply “depth.”²⁴ Metric depth encapsulates the most significant components of our felt experience of musical meter—the contrasts between what are commonly called “strong” and “weak,” “stressed” and “unstressed,” “accented” and “unaccented,” and so on. The greater the metric depth, the more that timepoints are felt as “strong,” “stressed,” and “accented;” the lesser the depth, the more they are felt as “weak,” “unstressed,” and “unaccented.” The advantage of the depth system is the relative precision the system permits; whereas “strong” and “weak” presents a bipartite distinction, depth introduces a numeric classification that permits finer comparisons of “strength;” it is by making such comparisons that we will be able to assess the relative merits of different listening strategies to various passages of Motive-Directed Meter.

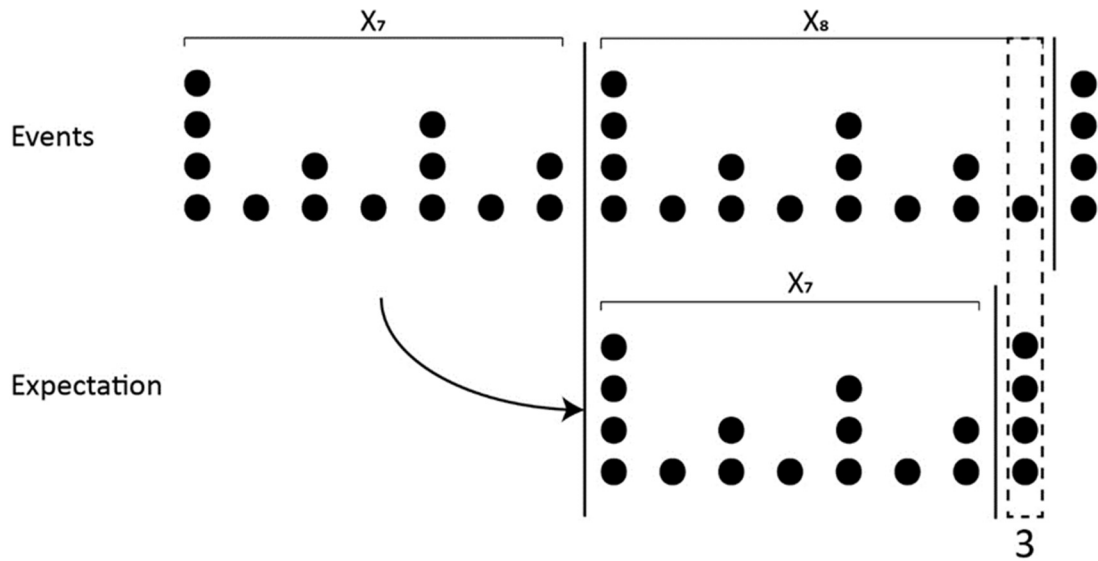
In my analytic model, the “arrivals”—that is, onset points—of motives are the crucial events towards which listener attention is directed in the Motive-Directed Meter listening experience. These timepoints signal the beginning of a motive statement, as well as the ending of that which has just been completed, enabling a final impression of the durational span of the just-completed statement. Markers of the very repetition that “thingifies” motives into recognizable entities, arrivals are the moments in which it becomes clear whether or not durational expectations were accurate. Timepoints marked by motive arrivals generally—though, as we will see, not always—coincide with the timepoints comprising what we might call the “downbeat pulse;” this is the reason for the coordination of statements and notated barlines in most examples throughout this project. Given the central importance of arrivals as the locus of attentional directedness, I will use these pivotal timepoints as the basis for all metric depth comparisons.

²⁴ Daphne Leong assesses metric depth in a similar way in her work on syncopation. Daphne Leong, “Generalizing Syncopation: Contour, Duration, and Weight,” *Theory and Practice* 36 (2011): 113-16. See also David Huron and Ann Ommen, “An Empirical Study of Syncopation in American Popular Music, 1890-1939,” *Music Theory Spectrum* 28, no. 2 (2006).

Consider a hypothetical listener who, expecting the currently unfolding motive statement to consist of eight units, realizes in the end that the motive ultimately comprised a 7-unit span; this situation is depicted in Example 2.12a. In this case, the anticipated arrival occurs exactly one unit earlier than expected, creating a significant mismatch between expected and realized metric experience. Specifically, our listener expected to feel this timepoint at metric depth 1—in fact, our listener *does* initially feel this moment at depth 1, and only retrospectively makes the adjustment to feel it at the final depth of 4. In this case, we encounter a mismatch of 3 depth positions between the expected depth 1 and the realized depth 4. I will refer to this as a “metric displacement” of -3 (or “-3d”). The negative sign encapsulates two components of the felt experience: first and foremost, it describes the distance which the listener *underestimates* the final-state pulse depth; in this case, our listener is 3 units under the ultimate depth of 4. And second, the signage informs us about the relative temporal placement of the anticipated and realized arrival points: *under any displacement with a negative sign, the arrival occurs earlier than anticipated*. The second meaning of the sign refers to this relative “negative” temporal position.



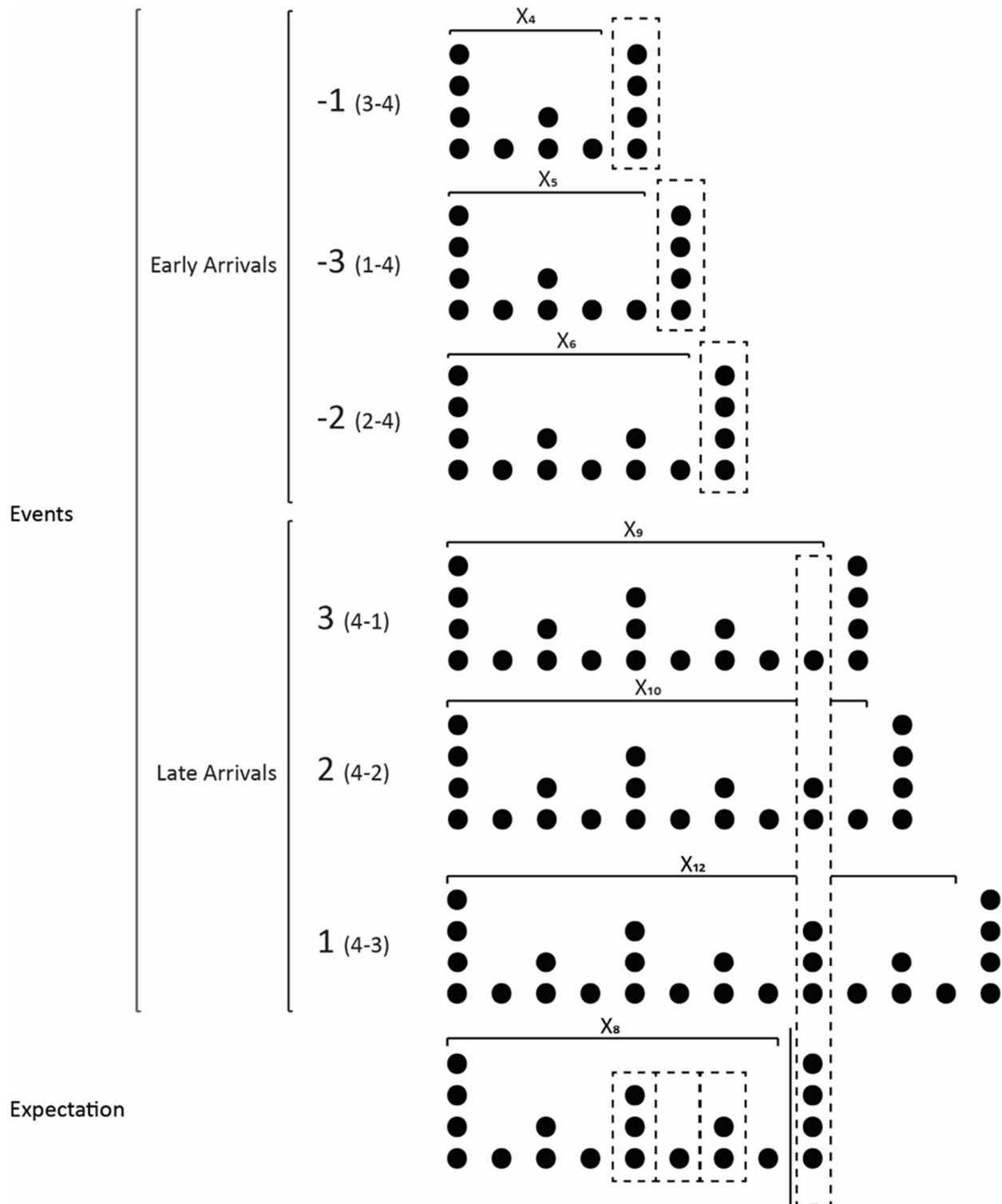
Example 2.12a. The method of calculating metric displacement for “early” arrivals



Example 2.12b. The method of calculating metric displacement for "late" arrivals

But what if the situation is reversed—that is, if our listener expects a 7-unit motive statement which ends up lasting one "extra" unit, ultimately spanning eight units? This situation is depicted in Example 2.12b. We cannot use the exact same calculation method as in early arrivals; there is no way to know exactly what the listener is expecting at the point of arrival, since the anticipated metric framework is already completed and the point of expected arrival has already passed. Will the listener replicate the same metric structure over again until the next arrival is reached? Will they abandon metric levels entirely and float unmoored until the arrival occurs and metric listening can resume? Since there is no way to consistently determine what happens after this moment of expectational termination, we will instead perform the calculation in the reverse way, assessing the difference between the initially felt, anticipated arrival and the final-state depth at that timepoint. As Example 2.12b shows, our listener anticipates an arrival at the eighth timepoint. When the expected motivic onset event does not occur—and perhaps even after the subsequent onset does occur at timepoint nine—our listener retrospectively reinterprets this moment to be pulse depth 1. This creates a displacement of (positive) 3 ("3d"), which tells us simultaneously that our listener overestimated the

depth of this timepoint, and also that the arrival occurred in a temporally later position than was anticipated. Example 2.13 provides several examples of depth displacement calculation, showing



Example 2.13. Additional examples of metric displacement calculation

shifts proceeding from the expectation of a pure duple, 8-unit (2222) meter. The number of pulse levels disrupted is ultimately the crucial factor in determining degree of displacement between distinct meters occurring in succession.

Metric displacement provides a rough picture of a listener's experience as they progress through a passage of MDM, indicating the accuracy of expectations and, in turn, something akin to the felt "difficulty" or relative metric "stability" of any given musical moment. But what exactly are a listener's expectations? Unfortunately, this question is difficult to answer; a given listener might be able to model their own expectations, but this self-analytic act could ultimately change those expectations in the process of attempting to pin them down. Rather than attempting to determine an ideal—or even "most probable"—set of expectations, I advance three simplified expectation-generating systems that model hypothetical listening strategies, providing, in combination, a rough picture of the potentialities of a given musical passage. These approaches may not model exactly any listener's actual experience; rather, they articulate points within the spectrum of expectational possibility. Using these expectation-generating systems, we can then determine the location, degree, and direction of instances of metric depth mismatch in a given passage, thereby approximating actual felt real-time metric experiences.

Following the first expectational approach, "local inertia" (L), our listener has no sense of association between motivic and metric content. Motives acquire no metric profile; rather, each measure is experienced in the context only of what came directly before, and metric inertia provides one's expectations for what will come next: that is, every measure is expected to be a replication of the same metric structure that preceded it. Even if a motive is followed by a different motive, this blind adherence to metric inertia supersedes any motivic associations, and the just-completed metric unit—bounded, as usual, by the ever-important arrival points—becomes the model for the now-beginning motivic utterance. This simple reproduction of duration is similar to Christopher Hasty's model of metric

projection, in which completed durations become projected forward in time and become the basis for the unfolding of new, identical durations.²⁵

Example 2.14 depicts local inertia at work in the “Devil’s Dance” passage from Example 2.7, showing how each motive statement becomes impressed in the listener’s attention and generates the metric expectations for the immediately following statement as it unfolds. Our listener has no expectation for the first motive statement, but once a new arrival is recognized on the downbeat of m. 2, the now-completed A₄ (2222) statement is projected forward and a new iteration of that metric unit is expected; this expectation is realized in m. 2. Furthermore, this metric expectation is reinforced by its successful replication in m. 2, such that m. 3 is now fully expected to again replicate (2222); this expectation is denied by the early appearance of the arrival of the fourth motive statement, confirming m. 3 retrospectively as a shortened (222) statement, simultaneously transforming the listener’s expectations into conformance with this new metric pattern. Now expecting (222), our listener is again

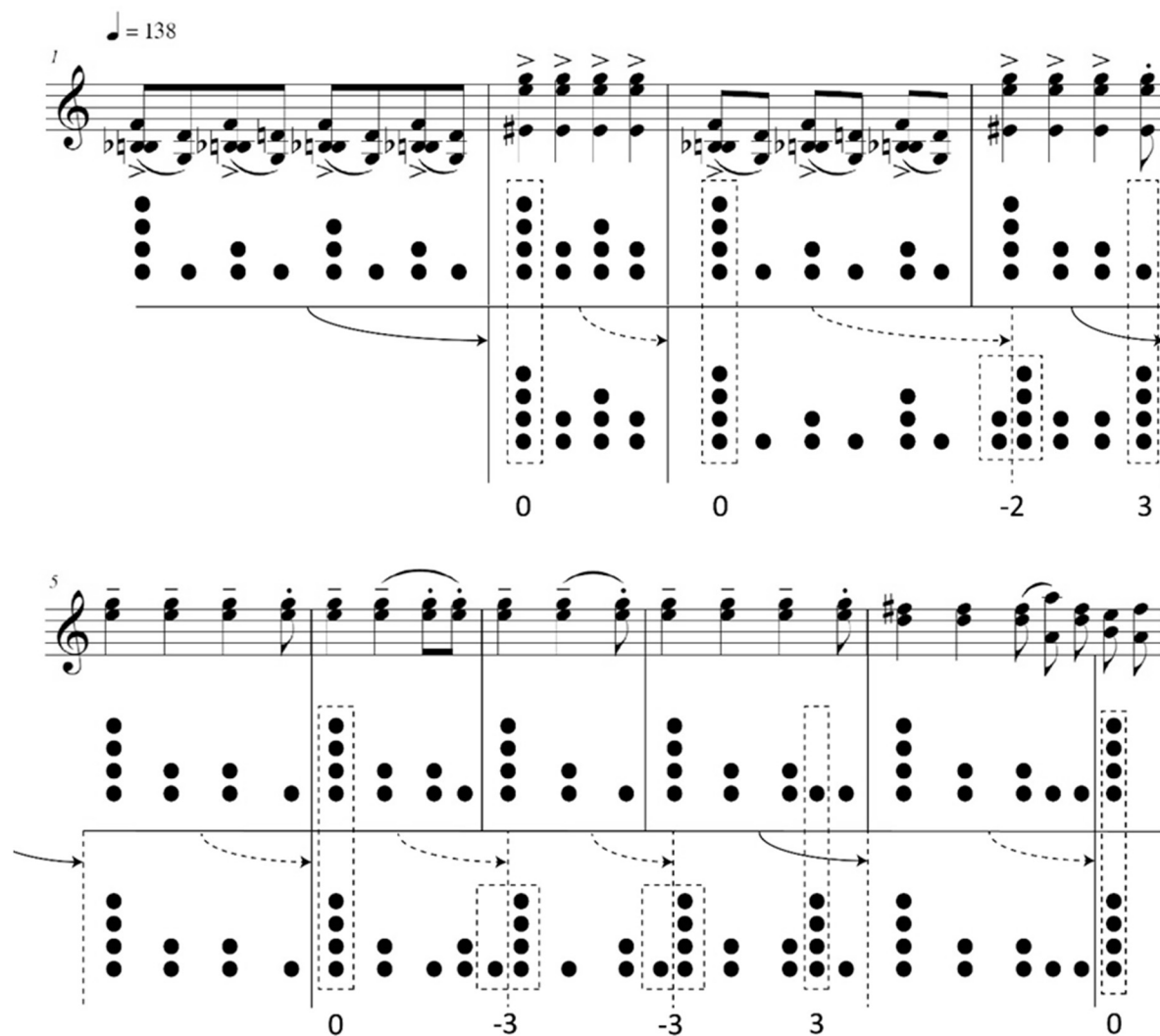
The image shows two staves of musical notation. The top staff begins with a treble clef, a key signature of one flat (B-flat), and a tempo marking of 138. Above the staff, four boxes contain the numbers 8, 8, 6, and 7, representing metric expectations. The first staff contains four measures of music. The first measure is marked with a '1' and a downbeat. The second measure is marked with a downbeat. The third measure is marked with a downbeat. The fourth measure is marked with a downbeat. The bottom staff begins with a treble clef and a key signature of one flat. Above the staff, five boxes contain the numbers 7, 6, 5, 7, and 7?, representing metric expectations. The first staff contains five measures of music. The first measure is marked with a '5' and a downbeat. The second measure is marked with a downbeat. The third measure is marked with a downbeat. The fourth measure is marked with a downbeat. The fifth measure is marked with a downbeat. Arrows indicate the flow of metric expectations from one measure to the next. Solid arrows connect the first measure to the second, the second to the third, and the third to the fourth. Dashed arrows with an 'X' mark connect the fourth measure to the fifth, and the fifth to the sixth. A solid arrow connects the sixth measure to the seventh.

Example 2.14. The generation of expectations in the “Devil’s Dance” passage under local inertia (L)

²⁵ Christopher Francis Hasty, *Meter as Rhythm* (New York: Oxford University Press, 1997).

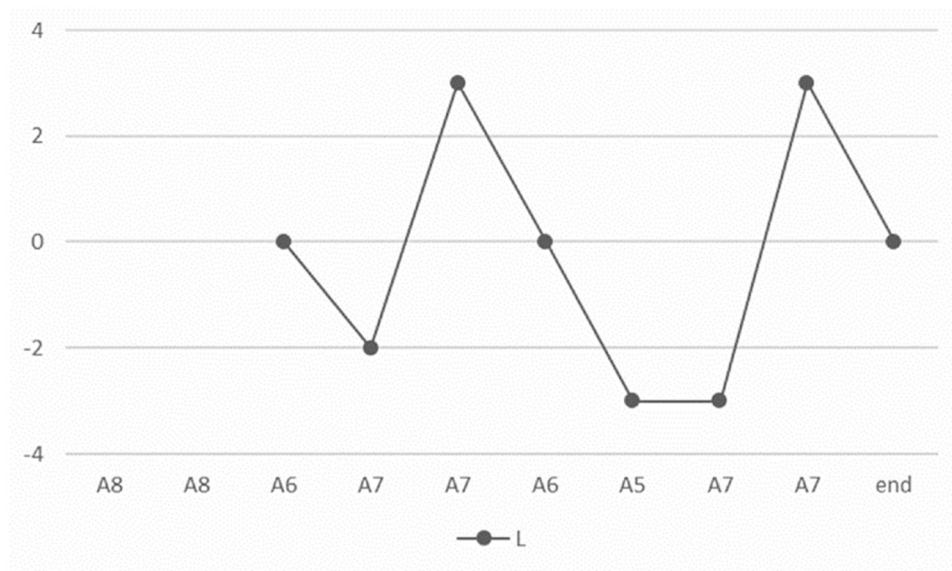
thwarted by the move to (223); this chain of continually re-calculated expectations continues throughout the excerpt, creating successful predictions for the arrival of m. 5 and for the final arrival that signals the conclusion of the passage; the remaining statement arrivals are incorrectly predicted.

We could simply tally the number of accurate predictions as a rough approximation of the success of this inertial listening strategy, but my metric displacement method enables a finer degree of assessment. Example 2.15 demonstrates how such calculations take place within local inertia, and the results of these calculations are graphed as Example 2.16. Since displacement is a measure of the



Example 2.15. Displacement calculations under local inertia (*L*)

discrepancy between expectation and realization, the aforementioned accurate predictions are represented with a 0. We can make a few initial observations from the general shape of this graph: first, there is a high degree of variance between the three possible predictive states: early, late, and on time. Of the 8 metric predictions made here, three are accurate, three are late, and two are early; a maximally even distribution. This parity contributes to the overall difficulty of the passage, since no single state stands out as dominant above the others. Second, we can see that non-zero values are quite high; four of five are the maximal value of $|3d|$ (metric displacement of absolute value 3), and the remaining fifth value is $|2d|$. In other words, when predictions are inaccurate, they are very inaccurate.



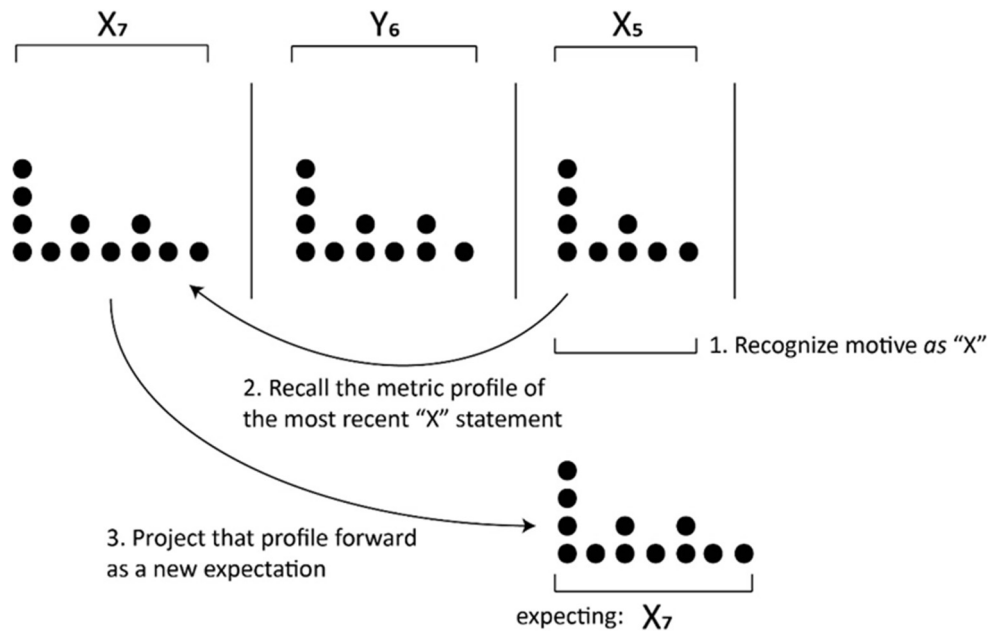
Example 2.16. Displacement values for the “Devil’s Dance” passage under local inertia (L)

Let’s also consider the displacement graph from a real-time orientation. The comfort of the first accurate prediction places our listener in a false sense of security, from which the initial $-2d$ early arrival abruptly wrests them; this is the first signal to a first-time listener that the passage may, in fact, evoke Motive-Directed Meter. The next statement, A_7 , then pulls the listener suddenly in the opposite direction by increasing complexity in three different ways, acting as 1) the first late arrival; 2) the first maximally-jarring instance of $3d$; and 3) the first irregular variability index 4 statement. After this, the

direct repetition of A₇ (223) provides increased predictive stability. This recurrence counterbalances the extreme unpredictability of the first A₇ and returns the listener to a place of relative stability reminiscent of the passage's opening, bisecting the passage into two parallel predictive zones, represented by similar displacement values: (0, -2, 3, 0), (-3, -3, 3, 0). The second zone replicates the displacement contour of the first, with two notable changes. First, the -2d of statement 4 is transformed to -3d in statement 8. The milder -2d of the first zone acted as a relatively smooth transition into the level 3 displacements that dominate the remainder of the passage; in the second zone, however, the listener is fully immersed in the MDM context and there is no need for a transition. Second, this initial early arrival lasted a single statement in the first zone, but the second opens with two successive instances of -3d, creating a locally extended period of successive early arrivals. Zone 2 then ends with a (3d, 0d) sequence, identical in displacement values to the ending of zone 1.

The initial dilemma that confronted us concerning this “Devil’s Dance” material revolved around its motivic identity; we considered both A/A’ and A/B options. The local inertia (L) expectation-generating method we’ve been using is content neutral, as long as arrival points are determinate; therefore displacement graphs of the A/A’ and A/B hearings would be identical. In order to explore the bipartite A/B approach to this passage, we need a system that derives expectations from the durations of specific motive statements. This second expectation system, “motivic inertia” (M), functions similarly to L in that, while pursuing this path, a listener derives expectations from the immediately prior event. Yet whereas that event was, in L, the preceding metric unit (bounded by arrivals), under M the listener recalls the most recent statement of the currently unfolding motive. This process, occurring in three steps for each new statement, is depicted in Example 2.17. First, the listener must recognize the currently sounding motive as a statement of the motive of which it is an instance; this necessarily occurs at least slightly after the actual timepoint of arrival, though the duration of the delay depends on a number of factors, including the distinctiveness of the motive and the degree of dissimilarity to other

motives with which it intermingles. Second, the listener recalls the most recently-completed statement of that same motive, including its associated metric profile. And third, the listener projects this recalled metric structure forward, expecting the currently-sounding statement to exactly replicate that most recently-completed span.

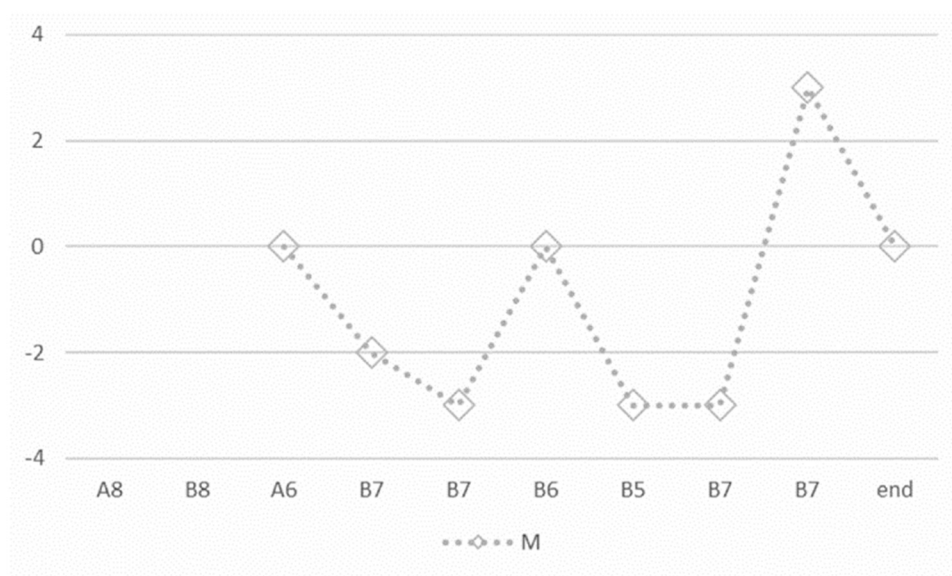


Example 2.17. The generation of expectations under motivic inertia (M)

In unitary motivic passages there is no distinction between L and M, since the most recently-completed metric unit and the most recently-completed motivic statement are necessarily identical. Upon the introduction of a second motive, however, the models diverge, since a listener pursuing M will frequently look to non-adjacent statements to derive expectations. This can be seen in the M approach to the A/B “Devil’s Dance” hearing, given as Example 2.18. The displacement graph for this approach is given as Example 2.19; the brevity of the passage, combined with the relative density of B statements in the second half, is such that this solution will not differ too dramatically from the A/A’ hearing. In fact, the approaches differ only with regard to a single motive statement: statement 5, which exhibited a level 3 metric displacement in A/A’, now presents a value of -3d. In other words, the depth 4 arrival

The image displays two staves of musical notation for the "Devil's Dance" passage. The top staff, starting at measure 1, shows a sequence of chords labeled A₈, B₈, A₆, and B₇. The bottom staff, starting at measure 5, shows a sequence of chords labeled B₇, B₆, B₅, B₇, and B₇. Arrows indicate the "expectation source" from the top staff to the bottom staff. A tempo marking of ♩ = 138 is present at the beginning.

Example 2.18. The generation of expectations in the "Devil's Dance" passage under motivic inertia (M)



Example 2.19. Displacement values for the "Devil's Dance" passage under motivic inertia (M)

occurs on a point expected to be depth 1 in both cases, but the arrival is early in A/A' and late in A/B.

This has notable consequences for the overall flow of the passage; a listener perceiving two separate

motives will no longer be able to experience the structure suggested in reference to A/A', since the second half no longer presents a transformed version of the first. Instead, the experiential flow of the excerpt is dominated by jarring early arrivals throughout, with a sudden late arrival upon the appearance of B₇ in m. 8. Although the experiential flow of M is distinct from that of L, the overall level of metric disruption is not substantially different. This is in fact atypical of M, which generally, in longer passages or passages with a more even intermixture of distinct motives, produces more accurate predictions than L. We will explore this, along with a third, more nuanced method for expectation generation, in Part III below.

III. THE ROLE OF MEMORY IN THE "SHROVETIDE FAIR"

The examples considered so far have retained their original metric notation and barline placement. Yet since I'm using metric notation to represent specific *heard* metric experiences, it will at times be necessary to re-bar musical examples from their original notation. Indeed, the function of the barline in Stravinsky's more metrically complex music has been a topic of some discussion. Stravinsky himself, according to Robert Craft, stressed the importance of notated barline placement in multiple interviews, asserting on one occasion that the "Metrical lines are constituent to the rhythm, not mute, inglorious markers which the conductor is invited to ignore for the sake of something he calls the phrase."²⁶ What is it that makes the lines constituent? Stravinsky claims that the "Bar line is much, much more than a mere accent, and I don't believe that it can be simulated by an accent, at least not in my music."²⁷ It would seem that barlines communicate information to the conductor—and to performers as well—that is more than merely analytic or descriptive; rather, these lines provide performance instructions. Yet the nature of these instructions is unclear at best, and as a result, under normal

²⁶ Igor Stravinsky and Robert Craft, *Retrospectives and Conclusion* (New York: A.A. Knopf, 1969), 43.

²⁷ *Conversations with Igor Stravinsky* (Garden City, NY: Doubleday, 1959), 21.

performance conditions, they may not provide a consistent, demonstrable effect on the performance—and, in turn, on the listening experience, with which we are centrally concerned here.

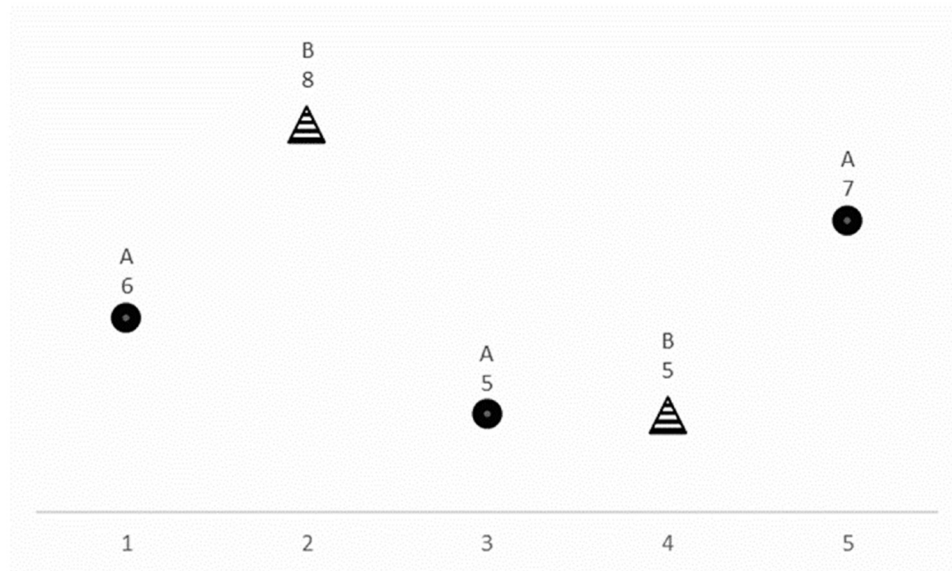
Cecil Gray suggests that the barline is ultimately a visual symbol, noting, in the context of the *Rite of Spring*, that the “Time-signature changes constantly from bar to bar, but the music itself does not; it is only the eye and not the ear which perceives the changes.”²⁸ Indeed, perceived musical boundaries or divisions frequently do not seem to coincide with notated barlines, especially within MDM listening experiences. For this reason, I will take the liberty in this and subsequent analyses to re-bar Stravinsky’s music for the purpose of presenting specific hearings for analysis. These re-barrings are not intended to be improvements over Stravinsky’s, since they serve a fundamentally different purpose than his performer-directing markings. As in all analyses so far, barlines will continue to demarcate heard motivic boundaries. In some cases, I will present and compare multiple barrings (hearings) of the “same” passage.

Example 2.20 presents a series of re-barred and reduced passages from “The Shrovetide Fair,” the first scene of Stravinsky’s *Petrushka*. The rehearsal number(s) for the passages are provided before each notated system—note that they do not appear in succession, but are separated by intervening materials. These passages together represent the sum of the “Master of Ceremonies” material, and are each sharply juxtaposed against adjacent contrasting sections by differences of motives, instrumentation, and tempi. As such, these brief passages stand out clearly from adjacent sections. Two of the passages are repeated multiple times, serving to further “thingify” them. The material of Example 2.20 presents prototypical MDM; there is therefore no need to plot it on the FMS, as was done with the previous two excerpts. As depicted in Example 2.21, these passages comprise two distinct motives, A and B, each of which appears in several durational variants. Most often, these two motives alternate regularly; this pattern is disrupted only at the beginning of Rehearsal 30, where three A motives occur in

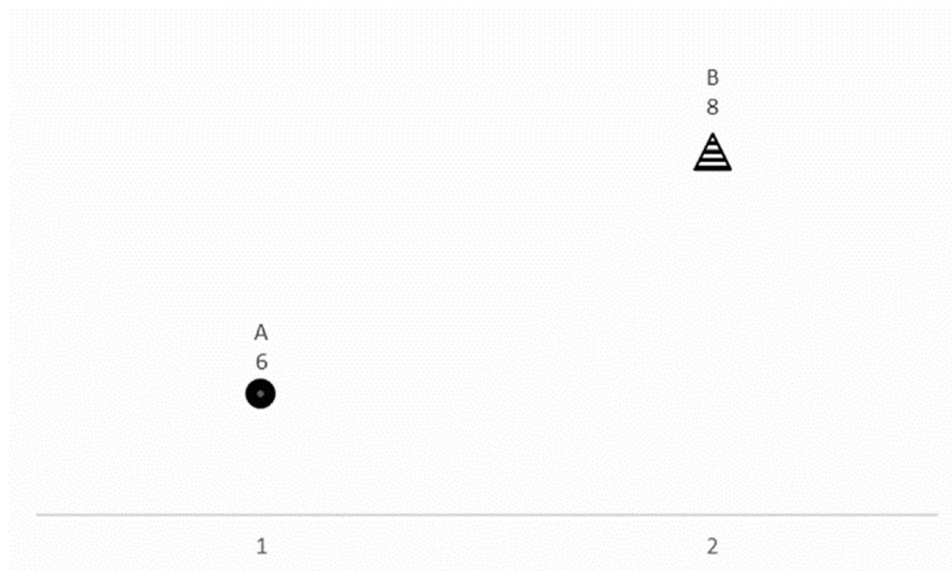
²⁸ Cecil Gray, *A Survey of Contemporary Music*, 2nd ed. (London: Oxford University Press, 1927), 143.

The image displays four musical staves, each representing a different rhythmic pattern (R 13/42, R 17/19/46, R 30, R 48) and its corresponding chord progression. The staves are arranged vertically. Each staff begins with a treble clef and a key signature of one flat (B-flat). The rhythmic patterns are indicated by the number of notes and rests in the first measure. The chord progressions are indicated by the labels in boxes above the staves. The staves also include various articulation marks such as accents, slurs, and breath marks.

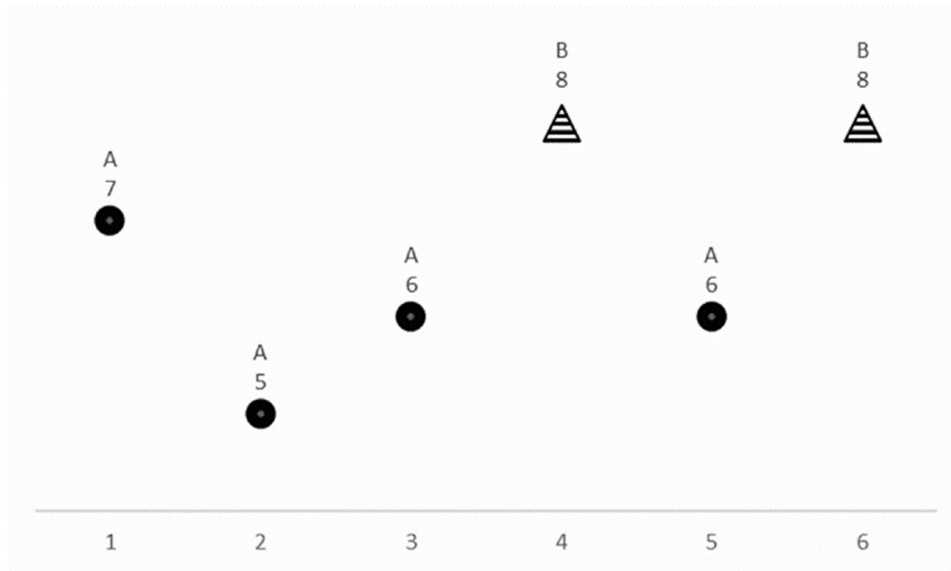
- R 13/42**: The first staff shows a rhythmic pattern of 13 notes and 42 rests. The chord progression is A₆, B₈, A₅, B₅, A₇. The pattern includes a triplet of eighth notes in the first measure and a series of eighth notes in the second measure.
- R 17/19/46**: The second staff shows a rhythmic pattern of 17 notes, 19 notes, and 46 notes. The chord progression is A₆, B₈. The pattern includes a triplet of eighth notes in the first measure and a series of eighth notes in the second measure.
- R 30**: The third staff shows a rhythmic pattern of 30 notes. The chord progression is A₇, A₅, A₆, B₈, A₆, B₈. The pattern includes a triplet of eighth notes in the first measure and a series of eighth notes in the second measure.
- R 48**: The fourth staff shows a rhythmic pattern of 48 notes. The chord progression is A₆, B₈, A₆, B₈, A₃, B₁₂. The pattern includes a triplet of eighth notes in the first measure and a series of eighth notes in the second measure.



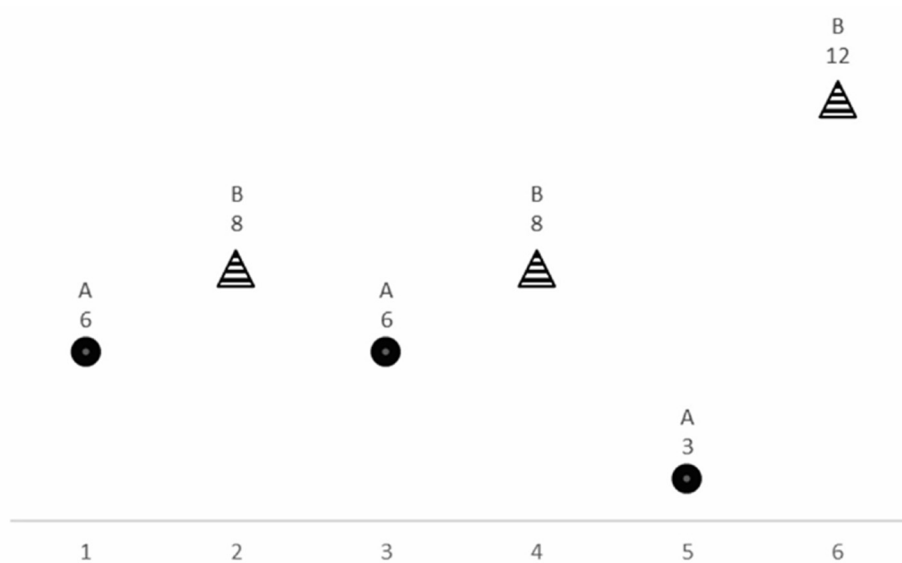
Example 2.21a. A motive map for "Shrovetide Fair," Rs. 13/42



Example 2.21b. A motive map for "Shrovetide Fair," Rs. 17/19/46



Example 2.21c. A motive map for “Shrovetide Fair,” R. 30

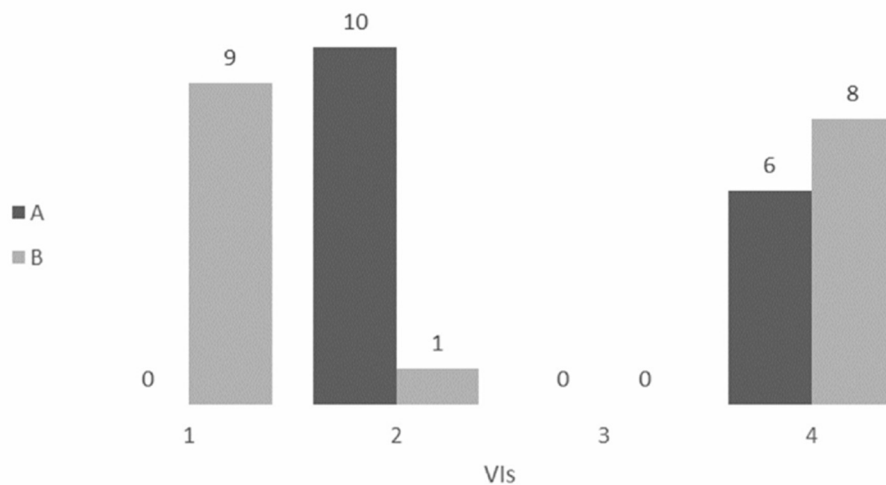


Example 2.21d. A motive map for “Shrovetide Fair,” R. 48

succession, the second A (A_5) replacing the expected B motive at this location. Given this almost entirely regular alternation between two distinct motives, we should expect the differences between the expectation-generation strategies described above—local inertia (L) and motivic inertia (M)— to be much more pronounced than in the “Devil’s Dance” passage of Example 2.7. But before calculating these

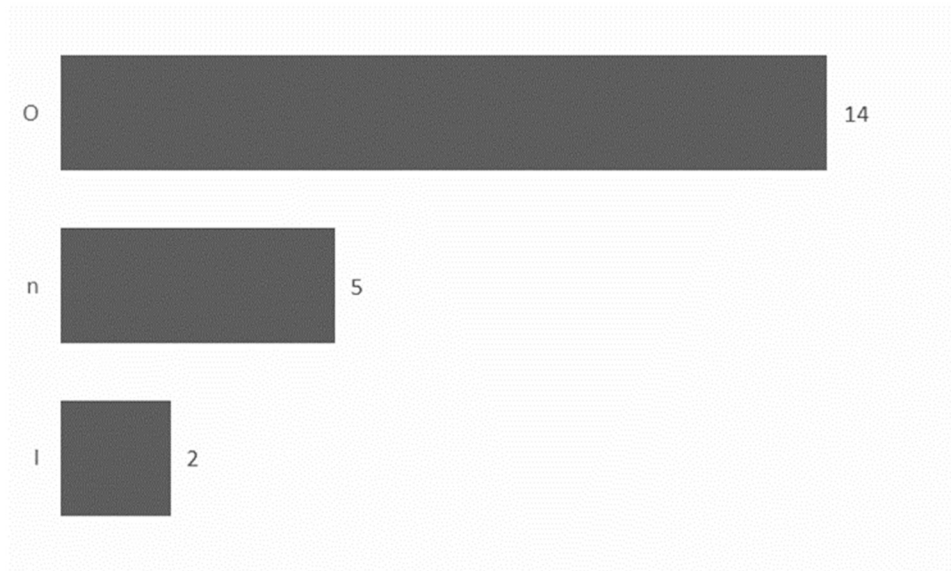
metric displacement values, let's consider some general features of these "Shrovetide Fair" sections shown in Example 2.20.

The distribution of our four meter categories across these passages is quite even, with the exception of odd meters, which do not feature at all, as shown in Example 2.22.²⁹ This equanimity is fairly uncommon in Motive-Directed Meter; recall, for example, the VI 4-biased distribution of the "Devil's Dance" passage. Metric relations, however, are not nearly so uniform. The passages are dominated by the Ordered subset/superset relation (O), as shown in Example 2.23, meaning that successive meters are typically related to one another, though not by of the closer relations that maintain an invariant element (durational span or tactus cardinality). More often than not, successive statements feel like shortened or lengthened versions of the preceding just-completed statement. Subset moving to superset is the predominant connection; 11 of the 14 O relations move from shorter span (222 or 23) to longer (2222 or 223), frequently creating a sense of expansion between adjacent statements.



Example 2.22. The distribution of meter categories (VIs) in the "Shrovetide Fair" passages

²⁹ In this analysis, I take the tactus to be the pulse notated with a combination of quarter and dotted quarter notes.

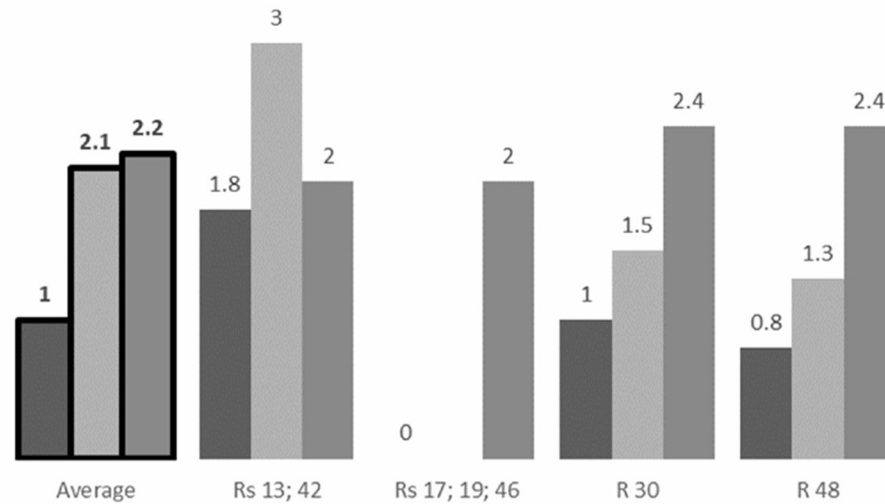


Example 2.23. The distribution of metric relations in the “Shrovetide Fair” passages

Given the near-even distribution of the A and B motives, these “Shrovetide Fair” passages present an ideal testing ground for the expectation-generation methods used to assess metric displacement in the “Devil’s Dance” passage above. Although A and B exhibit largely distinct metric behavior, it turns out that, when all passages are taken together, L and M expectation-generation strategies perform comparably: L exhibits an average displacement of 2.1 (2.1d), and M of 2.2d, as illustrated in Example 2.24. I will rely on histograms like this throughout this and the next chapter; these representations average out [the absolute value of] all metric displacements across the passage, providing a rough approximation of the predictive accuracy of a given expectation-generation method. Smaller numbers indicate better average accuracy, either because more predictions were correct (values of 0d), or because incorrect predictions resulted in less displacement (as a result of smaller metric depth discrepancies). Looking at Example 2.24, it’s clear that M actually performs slightly worse, on average, than L. How can this be? First, R. 13/42 features one instance of metric repetition across motivic change: A₅ (23) followed by B₅ (23). Both of these statements present different metric forms from the versions of

A and B that precede and/or follow them. As a result, L predicts the length of B_5 correctly, while M fails.

Overall, L averages 2d in R. 13/42, while M averages 3d.



Example 2.24. The average metric displacement values for the “Shrovetide Fair” passages under each expectation-generation method

Another reason for the relatively poor performance of motivic inertia is its absence from R. 17/19/46. Local inertia performs moderately well in this moment, providing a -2d value for the second arrival; yet since there is only one statement of each motive in these passages, a listener pursuing M has time only to acquire expectations, but no opportunity to deploy them. Therefore, in all three statements of this passage, L has the opportunity to lower its average displacement value, while M does not. Note that it is only because of the very high average level of depth displacement that the -2d values for L in R. 17/19/46 manage to lower that method’s average value relative to M. In R. 30 and R. 48, M begins to show its quality, performing much better than L. Both of these passages contain identical successive statements of A_6 and of B_8 , which significantly boost the predictive powers of M, roughly counterbalancing the difficulties this method faced in Rs. 13/42 and 17/19/46. Note that, although the overall average displacement values are similar for L and M, the actual metric experiences of listening

with these expectations are radically distinct; different arrivals are felt as early, late, or on time, creating sharply contrasting hearings.

We will return to consider each expectation-generating strategy below; yet given the significant number of motivic statements across all of these passages—particularly when considering the repeats of the first and second sections—it is unlikely that any real listener would remain in a pure state of either local or motivic inertia. Rather, as repetitions accumulate, a listener may subconsciously begin to mold their expectations into conformance with the statistical data presented, so as to arrive at even more accurate predictions than a blanket, non-specific strategy such as the inertia-based models permit. Local inertia is largely content-neutral; it is concerned with motivic content only to the extent that that content is able to articulate clear metric boundaries. Motivic inertia is more fundamentally rooted in content, though only in a localized, comparative sense—the actual details of the motivic structure are still largely unimportant, as long as the listener retains a memory of the most recent articulation of each motive. Furthermore, these inertial strategies are temporally constrained. Pursuing L, the listener need only retain the most recent metric structure in memory. Pursuing M, the requirements are slightly larger—retention of the most recent statement of each relevant motive—but still quite temporally limited. The third and final expectation-generating strategy, which I term the “prototype” (P) approach, remedies this limitation and allows for a more flexible and dynamic approach.

The prototype expectational approach assumes that a listener has reached a state of moderate familiarity with a particular motive, enabling quick recognition, and that the listener is able to retain more information about that motive in memory than the duration of the most recent statement. A greater reliance on long-term memory is fundamental, for the listener will use this ever-growing storehouse of knowledge to refine their understanding of the motive and its attendant possibilities as a passage of MDM progresses. At its core, this method assumes that a listener will maintain a working sense of the most prototypical form of a given motive and expect that form at each new statement.

Successful predictions of that prototype form confirm it, encouraging its redeployment, while inaccurate predictions disconfirm it as prototype, paving the way for a new form to take its place. This means, crucially, that a prototype (P) approach is not a rigid algorithmic undertaking—as were L and M—but a flexible, dynamic process that a listener continually refines as an MDM passage unfolds. Note that, although it relies on memory, a prototype approach develops within a first-time listening experience, as a listener begins to recognize the behavior of repeating motives. The three main expectation-generation methods I use in this and the next chapter are summarized in Example 2.25.

Abbreviation	Expectation Method	Source of metric expectations
L	Local inertia	Most recently completed statement of any motive
M	Motivic inertia	Most recently completed statement of current motive
P	Prototype	Prototypical version of current motive

Example 2.25. A summary of the three expectation-generation methods

Because different motive forms may contend for status as the prototype form, we need to clarify the means by which a form achieves prototype status. Ultimately, the prototype represents the listener’s working model of the motive, a “best estimate” maintained by the listener to which they naturally gravitate under normal listening conditions. All other motive forms are compared to this prototype. From a metric perspective, the most essential type of comparison here is temporal: varied, non-prototype forms are often clearly recognizable as longer or shorter variants of the prototype form. Other metric comparisons are possible as well, such as a change to the intermediate pulse structure without a change of total span, as well as comparisons concerning non-metric types of transformation.

A motive form may become impressed as prototype through a number of means, which I theorize by way of three Prototype Preference Rules (PPRs):

PPR 1: Prefer motive forms with relatively high frequency

Simple frequency has the power to highlight a particular form relative to others. Listeners gain a rough sense of the distribution of different motive forms while attending to a musical passage, and use this statistical information to determine the relative priority forms. It is therefore by means of frequency that I will most often determine motive prototypes, though this statistical information can be acquired only gradually; in other words, a listener does not have access to the end-state distribution of motive forms at the outset of a passage, but must build it up in real time while simultaneously using that information to generate expectations.

PPR 2: Prefer motive forms that are relatively metrically stable

Metrically simpler forms are easier to retain than their more complex counterparts, at least for Western listeners. We can use the variability index introduced in Example 2.4 as a simple guide to relative complexity. Motive forms with low VI contain less information that must be retained and re-enacted during the entrainment process: “pure duple” meters require the listener to know only the total cardinality (2, 4, 8, 16, etc.); other “Kirnberger” meters require one to also know which pulse relations are duple and which are triple; “odd” meters also require tracking one or more non-isochronous pulses above the level of the tactus; and “irregular” meters require attending to a tactus that is itself non-isochronous. Furthermore, listeners enculturated in Western music are much more familiar with the more stable meters, and are therefore more likely to default to them, all other things being equal.

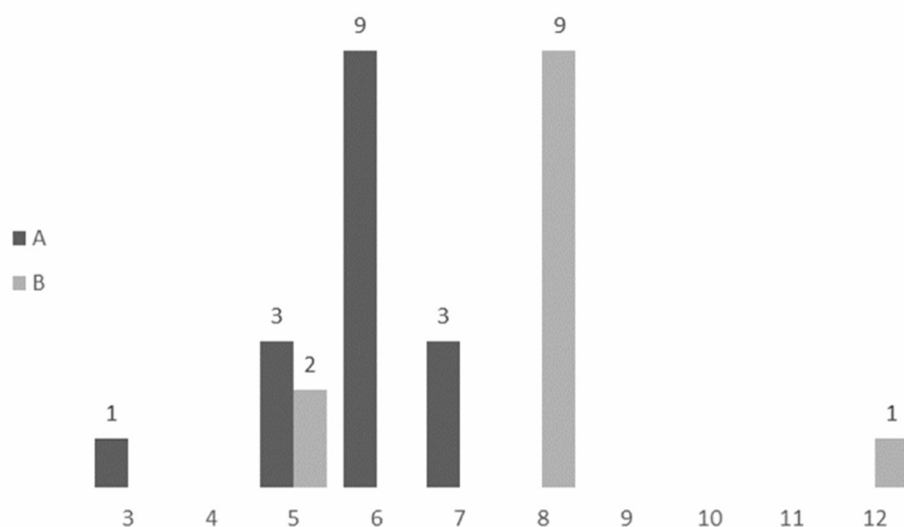
PPR 3: Prefer motive forms that appear at moments of significant formal articulation.

Primacy effects provide powerful memory aids; when listeners recall a particular motive, it’s likely that the significance imparted to the motive form via its initiatory function will lend additional credence to

that form and elevate it above competing forms, which may then be heard as later variants of that initial, primary form.³⁰

It just so happens that, in the case of our “Shrovetide Fair” excerpts, all three Prototype Preference Rules agree on which motive forms should be considered prototypical for both motives A and B. For PPR 1, consider the motive form distribution graph given as Example 2.26. There are sharp 9-instance peaks for motive forms A₆ and B₈. Motive B sticks close to this prototype B₈ form; there are only two instances of the shortened B₅ form, and one of final B₁₂ outlier form that concludes the final passage. Motive A is slightly more variable, though the non-prototypical forms—A₅ and A₇—cluster right around the normative A₆. A₃, the clear outlier, occurs alongside the outlier B₁₂ at the conclusion of R. 48. There is no ambiguity, for either motive, as to which form predominates over others in terms of pure cardinality. Turning to PPR 2, it turns out that these same motive forms—A₆ and B₈—are the most metrically stable for their respective categories. A₆ (222) is a VI 2 “Kirnberger” meter, while A₅ and A₇ are irregular; B₈ (2222) is VI 1—pure duple—while B₅ is irregular. It’s clear that PPR 2 agrees with PPR 1. Finally, let’s consider the placement of forms: the prototypical pair A₆B₈ initiates three of the four unique sections, and seven of eight total sections; R. 17/19/47 comprises one statement of this pair only. Furthermore, at the beginning of R. 48 the pair is stated twice in direct succession. These prominent placements elevate A₆ and B₈, causing subsequent forms to feel like modified variants of these more prototypical forms that precede them. Given the agreement of all three PPRs, it seems implausible that any forms other than A₆ or B₈ could rise to the status of motive prototype.

³⁰ Arthur M. Glenberg et al., “A Two-Process Account of Long-Term Serial Position Effects,” *Journal of Experimental Psychology: Human Learning and Memory* 6, no. 4 (1980).



Example 2.26. The distribution of motive forms in the “Shrovetide Fair” passages

As shown above in Example 2.24, the Prototype approach produces significantly more accurate predictions than true or motivic inertia. Whereas those approaches give average values of 2.2d and 2.1d respectively, a listener always expecting motive A to be A_6 and B to be B_8 will experience an average displacement of only 1d. It should be noted that the P method makes more predictions than the other approaches, since it does not require a sample statement in order to get the inertial process underway. In some cases, this is an expectational boon, as in R. 13/42, where the P approach makes two accurate predictions before M can make any, and one before L; both of these are accurate predictions at 0d. The opening of R. 30 is somewhat different; this section opens with two non-prototype statements of motive A, creating a maximally inaccurate -3d prediction in the P model prior to any inertial predictions.

Using Example 2.24 as a guide, let’s consider how the Prototype approach differs, from an experiential perspective, from L and M. P starts out very strong in R. 13/42, but, given the non-standard forms that conclude this passage, it offers no improvements for the final three statements. This section is likely to be felt as a bifurcated into two zones; the first totally predictable, the second suddenly deviant. R. 17/19/46 has the unique privilege of being perfectly predicted under the P method, serving

therefore only to reinforce the listener's confidence in this approach each of the three times this section occurs. In R. 30, the listener experiences the opposite predictive experience from that of R. 13/42—the non-standard A_7A_5 pairing is not successfully predicted, creating a notably jarring opening that is quite different than that of every other section. Yet the unpredictable nature of this opening is counterbalanced by not one, but two subsequent statements of the prototypical A_6B_8 set, allowing the prototype-seeking listener to regain predictive control before this brief passage concludes. Finally, R. 48 returns to an experiential process akin to R. 13/42, in which a number of motive statements—now a full two pairs of the normative A_6B_8 set—create a strong metric foundation, from which the final two motive statements again deviate. Yet instead of the somewhat familiar and only marginally deviant B_5A_7 set that concluded that earlier R. 13/42 passage, the final R. 48 now concludes with entirely new motive forms: the highly unique A_3B_{12} set. Not only are these forms as yet unknown, they deviate significantly from the prototypical forms of these motives; A_3 is the most divergent A form at -3 units relative to A_6 , and B_{12} the most divergent B form at +4 units from B_8 . Clearly, these forms also depart from one another in that one is massively reduced, and the other massively lengthened relative to P expectations. This creates a startlingly unexpected conclusion to a passage which hitherto felt secure and predictable, rounding off all of the “Master of Ceremonies” material for the entire “Shrovetide Fair” scene with the most striking moment yet encountered.

If none of our three expectation-generation approaches are able to predict moments such as the final A_3B_{12} set, is there some other method which can? Ultimately, the Prototype approach is the most advanced quasi-automatic process I advance here, and it itself marks an important point in a longer process of familiarization and predictive improvement. In fact, as a listener becomes increasingly familiar with the constitutive materials of a musical passage, they may progress through the methods set forth here, as diagrammed in Example 2.27. As discussed previously, a listener has, at first encounter with new MDM materials, no sense of motivic identity, and thus relies upon metric information alone,

enacting a local inertia approach. As distinct motives come into focus, the listener begins to retain a sense of metric identity along with those materials, encouraging a shift to motivic inertia. Then, as certain patterns and tendencies within individual motives rise to the surface—as outlined with regards to the prototypical preference rules—certain metric structures gain prominence above others as longer-term memory becomes engaged, shifting the listener towards a prototype approach.

Stage	Expectation Method	Criteria	Burden on Memory
1	Local inertia	None	Minimal
2	Motivic inertia	Motivic identity	Low
3	Prototype	Metric profiles	Moderate
4+	Beyond prototype	Rote memorization	Significant

Example 2.27. The stages of learning a passage of Motive-Directed Meter

What happens next? Unfortunately, this question is quite difficult to answer. I believe a flexible prototype approach which is capable of change in real time during a listening experience is sufficient to model the intricacies of a first-time hearing. But of course, the process of familiarization does not end here—long-term memory becomes ever more important during subsequent hearings as a listener shifts away from these automatic and quasi-automatic expectation-generating processes and learns the location of specific motive forms. At this point many different forms of the same motive may be in play at once as the listener seeks to deploy each at the correct temporal and formal moment. Yet the complexities of modeling such an experience will rely upon a deep understanding of human memory, which is, at the very least, beyond the scope of the present project. This is the primary reason for largely constraining this inquiry to the first-time listening experience, wherein a single form of each motive generally predominates over the others, and the messy networks of temporal association need not be disentangled in a haphazard fashion that may not accurately represent the way musical memory actually unfolds. Ultimately, the model presented in Example 2.27 is necessarily an abstraction and simplification which is unlikely to match exactly the experience of any single listener. Yet this is not its purpose—

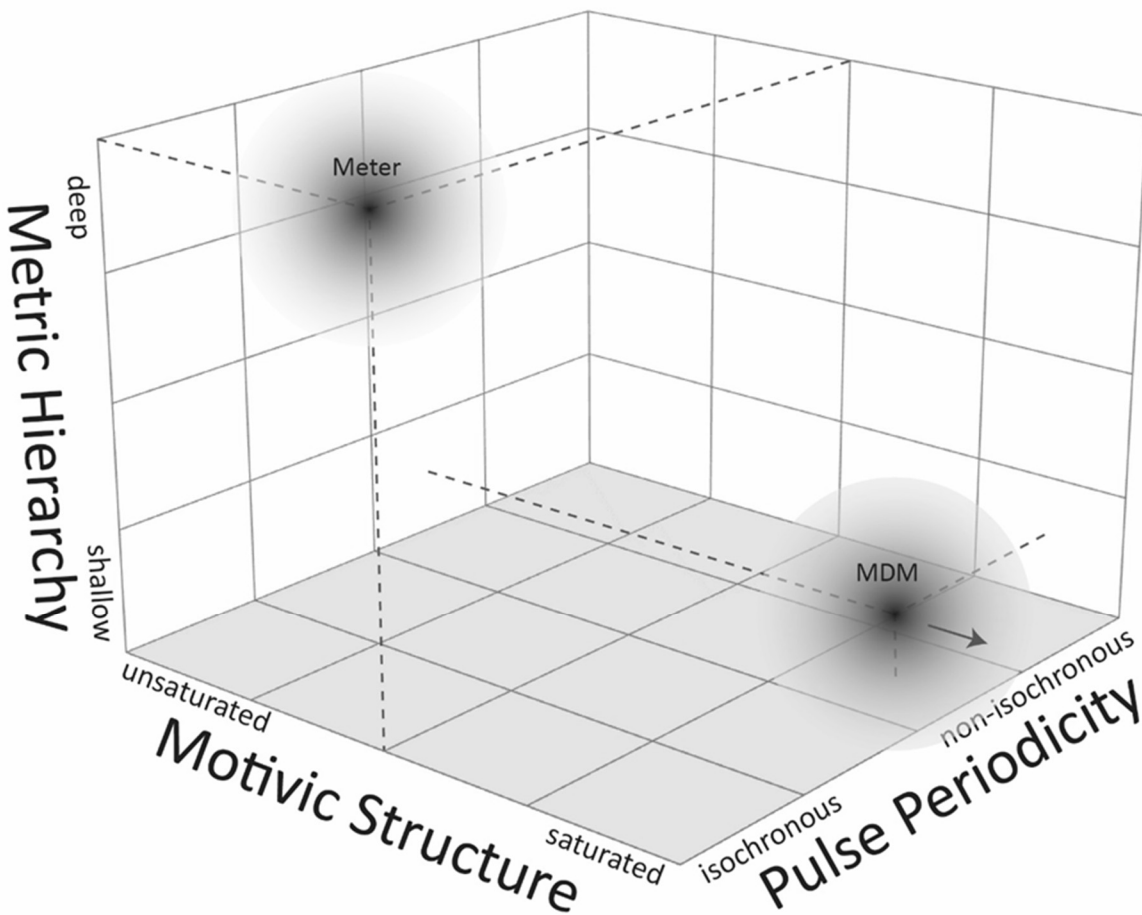
instead, it provides a framework for conceptualizing the learning process which does capture its most crucial features: increasing familiarization with motivic and metric materials, and the increasing predictive accuracy usually results.

IV. MOTIVIC AMBIGUITY IN THE “EVOCATION OF THE ANCESTORS”

The “Evocation of the Ancestors” scene from the *Rite of Spring* presents a new set of challenges to the analytic procedures developed in this chapter, challenges which provide the opportunity both to demonstrate the various components of the method presented here, as well as to consider solutions to new issues of ambiguous motivic identity within the context of this system. The scene itself is relatively short, comprising five short segments of MDM materials that alternate with brief interjections of contrasting accentual material which punctuate these MDM segments and separate them from one another. The five separate MDM segments are notated as Example 2.28; note that this example presents the segments without any motivic parsing. The MDM materials are, as we will see, so densely motivically saturated that they give rise to motivic ambiguities; this non-normative state is represented by the trend line on the FMS in Example 2.29. Unlike those passages considered thus far in the present chapter, the “Evocation” has received analytic attention from several Stravinsky scholars, most notably Pieter van den Toorn and Gretchen Horlacher; we will pause to consider the fruits of their work, comparing and contrasting their contributions with the perspective gained from the methods presented in this chapter.

The image displays five musical segments, numbered 1 through 5, arranged horizontally. Each segment is written on a single staff in treble clef. Segment 1 includes a tempo marking '♩ = 144'. The segments contain various musical notations, including eighth and sixteenth notes, rests, and dynamic markings such as accents (^). Segment 4 is notably longer than the others, spanning multiple staves. The segments are presented as reduced versions of the original music, focusing on the melodic and rhythmic elements without motivic parsing.

Example 2.28. The five MDM segments from the “Evocation of the Ancestors” scene from Stravinsky’s *Rite of Spring* (Stravinsky, 2005), reduced and without motivic parsing



Example 2.29. The FMS depicting how the “Evocation of the Ancestors” trends towards greater motivic saturation than prototypical MDM

Van den Toorn describes the scene as comprised of two blocks, “Block A” and “Block B;” the latter comprises the five MDM segments I’ve notated in Example 2.28. As discussed in Chapter 1, much of van den Toorn’s work on what I’ve termed MDM revolves around his notion of “background periodicity,” which normalizes and regularizes the irregular durations of the musical surface.³¹ In the case of the “Evocation,” van den Toorn notes that, although the musical surface suggests a feeling of background periodicity, there is no normal, regular background periodicity that can fully normalize the

³¹ Pieter C. van den Toorn, *The Music of Igor Stravinsky* (New Haven: Yale University Press, 1983), 224-27.

irregularities of the surface.³² Because the background periodicity does not have a strong regularizing pull, van den Toorn asserts that, “With subsequent repeats of Block B’s initial motives, the listener is more apt to readjust his/her metrical bearings than to preserve with the diminishing traces of a prevailing periodicity.”³³ He agrees, then, that these passages encourage a parallelism-centric listening strategy, despite the latent pull of an underlying periodicity; this matches my hearing of the Block B material as evoking an MDM experience.

In his analysis, van den Toorn devotes much attention to Stravinsky’s various sketchbooks and revisions, which feature a substantial number of barring changes without any fundamental transformations to the rhythmic structure, and notes that certain metric effects of earlier drafts continue to carry through into the final version.³⁴ Central to van den Toorn’s conception of the scene is his assertion that a basic “a7 motive”—reproduced in part as Example 2.30—acts as an originary motive throughout, from which following varied elements are subsequently derived.³⁵ As his “b5” motive label in Example 2.30 makes clear, van den Toorn is not conceptualizing motivic organization in the same way that I am. Given a listener-oriented approach, van den Toorn’s “a” and “b” motives are indistinguishable for most of their duration, and become differentiated only at the point at which “b” terminates and “a” continues. My listener-oriented approach to motivic labeling would note the commonalities of his “a” and “b” and describe them as two instances of the same motive—let’s say motive A—labeling them A₇ and A₅. It seems to me that van den Toorn’s approach to motives is simultaneously more poietic and more structuralist than my own.

³² *Stravinsky and the Rite of Spring: The Beginnings of a Musical Language*, 85.

³³ *Ibid.*, 86.

³⁴ *Ibid.*, 87.

³⁵ *Ibid.*, 86.



Example 2.30. A portion of van den Toorn's "a7" motive from the "Evocation of the Ancestors" (Example 27; van den Toorn, 1987)

Since van den Toorn derives all statements from his "a7" motive, the irregular "4+3" structure of this original motive is central to his analysis; indeed, he notes that, "with the trimming of 4 + 4 into an 'irrational' count of 4 + 3, the shortened b5 repeat at m.3 assumes, in relation to a7, a syncopated identity. In accord with the $\frac{2}{2}$ periodicity as inferred from a7's opening $\frac{2}{2}$ bar, and in direct opposition to the fixed metric identity of the reiterating motives as defined by the shifting meter, the initial onbeat identity of motive a7 is contradicted by an offbeat placement at mm.3—4."³⁶ This observation is at the heart of the remainder of his analyses, and so it bears unpacking; we can boil this down to three key points. At one level, van den Toorn is simply noting the complexity of odd meters, which, as we have already seen, are inherently more difficult to entrain than their much more common metrically prototypical counterparts. Van den Toorn does suggest that a listener could hypothetically expect a 7-pulse scheme, but rejects this proposition in this case because of both innate binary preference and the way in which the passage initially sets up duple expectations. This leads us to the second point, wherein van den Toorn is advancing an inertia-based orientation; his listener is primed by the "2/2" opening bar,

³⁶ Ibid., 90.

expecting that metric pattern to be replicated, regardless of motivic content (which is not relevant yet, since, according to his analysis, a full motive statement has not yet been completed). Combining both of these observations, we see the full extent to which van den Toorn's perspective is rooted in a periodic framework; beyond the large-scale "background periodicity" alignment events discussed earlier, the rhythmic/metric framework is, at all hierarchical levels, subject to duple bias, even when not pursuing a "conservative" hearing explicitly. And third, it's clear that van den Toorn's analysis emerges, at least in part, from a compositional standpoint, since he makes references to drafts in order explain analytic observations, as when he notes that "the 7 + 7 and 7 + 5 schemes of the autograph and 1929 revision are a condensation of a square 8 + 8 scheme, so that, at the higher level in the 1929 revision, a potential 1—2—1—2 count shrinks to 1—2—3. Yet a duple alternative at this level...would not appreciably have altered the disruptive effect...on behalf of the triple mold."³⁷

Gretchen Horlacher's approach to the "Evocation of the Ancestors" contrasts sharply with that of van den Toorn. Where the latter scholar saw fragmentation and discontinuity struggling against the suggestion of periodicity, Horlacher is concerned with demonstrating continuity on a larger structural level. She shows how the progression of the MDM passages across the entire scene exhibit an arch form organization—a coherent, goal-directed sequence that contrasts with van den Toorn's primarily low-level sense of disorganization. This difference of approach arises in part from the quite different sense of motivic structure that Horlacher presents, reproduced here as Example 2.31.³⁸ Like van den Toorn, she considers the initial 7-beat gesture to be fundamental, recognizing all future material as derived from contractions and expansions of this basic unit. Her derivation and subsequent analysis are careful and nuanced, but her discussion of the metric qualities of the material are quite brief: "My reading...indicates a two-part melody: although barred differently, each of its parts has a distinctive way

³⁷ Ibid., 92.

³⁸ Horlacher, *Building Blocks: Repetition and Continuity in the Music of Igor Stravinsky*, 86.

of beginning, marked by three C's in a half-quarter-quarter durational pattern that suggests counting a half-note tactus (and possibly even a duple measure)...the sense of 'restarting' is particularly evident because the return to the long C comes at the wrong time, after three quarters (rather than two or four.)"³⁹ It's clear that, in addition to taking the 7-unit as the basic motivic entity, Horlacher is also operating under many of the same assumptions as van den Toorn, particularly the privileging of the duple and the assumption of basic inertial listening strategies. These assumptions make sense in the context of a first hearing of the first few bars, but what about subsequent developments? Because of Horlacher's lack of attention to the metric experience, we cannot be sure of her exact vision of this listening process; like van den Toorn, she shows generation, relation, and development, but does not delve deeply into metric relationships or the experience thereof.

I am intrigued, however, by Horlacher's chart of motivic relationships, which captures well the similarity of materials as various entities recur. Yet ultimately, I find the 7-unit motive too large a structure to take as a basic constitutive element, particularly in light of the substantial transformations to which it is subjected. It's easy to see the relations that Horlacher has thought out and presented to us in a clear spatial-visual format, but not so easy to make all of these associations in real time while listening to the passage unfold. For this reason, I divide van den Toorn and Horlacher's 7-unit motive into two separate motives, A and B, which contrast and alternate with one another throughout each of the MDM segments; the first statements of A and B are shown in Example 2.32. According to this interpretation, motive A is a pure duple, 4-unit motive consisting entirely of the pitch C, while motive B is triple and comprises the neighbor note-like figure centered around the pitch D. As presented in these initial versions, the motives are distinct and unambiguous; the combination of pitch and metric distinction would ensure that each is instantly recognizable upon each recurrence.

³⁹ Ibid., 87.



Example 2.32. van den Toorn and Horlacher's 7-unit motive, split into two distinct motives, A and B

Of course, the actual unfolding of materials in the “Evocation of the Ancestors” is not so neat; conforming to the requirements of MDM, the A and B motives given in Example 2.32 are subjected to a number of manipulations and alterations that obscure their identity and break down the boundaries that separate them. This is due to the fundamentally underdetermined nature of the motivic materials themselves, particularly the extremely restricted range of pitch content—a fact commented on by both van den Toorn and Horlacher.⁴⁰ My proposed motives A and B may be instantly recognizable in their original presentations, but as the two defining features mentioned above—pitch content and durational span—begin to be transformed, the largely undistinctive nature of the motives becomes apparent, and ambiguity quickly arises. This is a problem for my analytic system, depending as it does on metric predictions intimately informed by recognized motivic content. We need some way to get a handle on the uncertainty at play in this scene.

Fortunately, the solution requires no drastic overhaul to the techniques established thus far, only that we be willing to employ them multiple times to study different interpretations and compare the results. For, as we have seen, the goal of the listener-oriented analytic process is not to freeze a given interpretation into fixity, but to explore the consequences of divergent approaches; we can do this by laying out those different metric conceptions of the material that will be vying for prominence in an ambiguous reading, evaluate each in turn, and consider some possible means by which they might become threaded together into a cohesive, progressive listening experience. There are countless ways

⁴⁰ van den Toorn, *Stravinsky and the Rite of Spring: The Beginnings of a Musical Language*, 87. Horlacher, *Building Blocks: Repetition and Continuity in the Music of Igor Stravinsky*, 83-84.

to parse the MDM segments of Example 2.28 into discrete motives; here I will examine and compare four possible motivic parsing strategies. These parsing strategies will be discussed in order of what I take to be increasing plausibility, with the final fourth parsing method matching my own listening experience.

Before digging into the first motivic parsing, let's consider some general features of the five MDM segments, as shown unparsed in Example 2.28. Segment 1 is introductory, setting up the opposition between contrasting motivic elements without much elaboration. Segments 2 and 5 are identical in pitch and rhythmic content, though segment 5 features dynamic accentuations that are absent from segment 2. These segments are so brief that, in most cases, predictive machinery does not have time to get off the ground, and few expectations are able to form; these segments tease the listener, engaging their MDM listening strategies without providing substantive material to interact with. It is segments 3 and 4 that provide the real meat of the "Evocation" scene: segment 3 presents 8-12 motive statements, depending on the parsing strategy used, while segment 4 gives 10-16. There are notable similarities between segments 3 and 4: a substantial central portion of the segments are roughly identical, as suggested in Horlacher's derivation (Example 2.31). There is also a general increase in segment length across this scene, excepting the "fake-out" segments 2 and 5, giving a listener increasing time to make and apply metric expectations as the motivic materials become more familiar.

Let's examine the first motivic parsing, which I believe to be the least plausible of the four we will consider here, notated in Example 2.33a. In parsing 1, motive A is triple and B is duple. Every instance of A features only the pitch C, while motive B is marked by the appearance of the pitch D that signals its conclusion. Both of these qualities are weak: although A clearly is able to be structured as a triple group, there are no clear cues that explicitly suggest it; motive B begins with the exact same pitch (C) and durational value (quarter) as concluded motive A. Combined with binary preference, it is quite unlikely that a listener would gravitate to this version of the first motive over duple forms that are supported by duple bias and reinforced by notable events. Furthermore, given the linear flow of time,

parsing 1b:

parsing 1a:

1

1b:

1a:

2

1b:

1a:

3

1b:

1a:

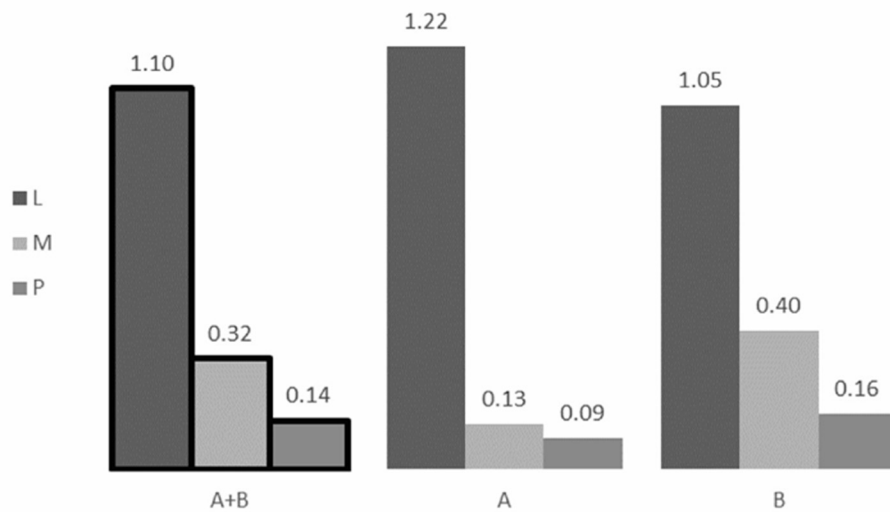
4

1b:

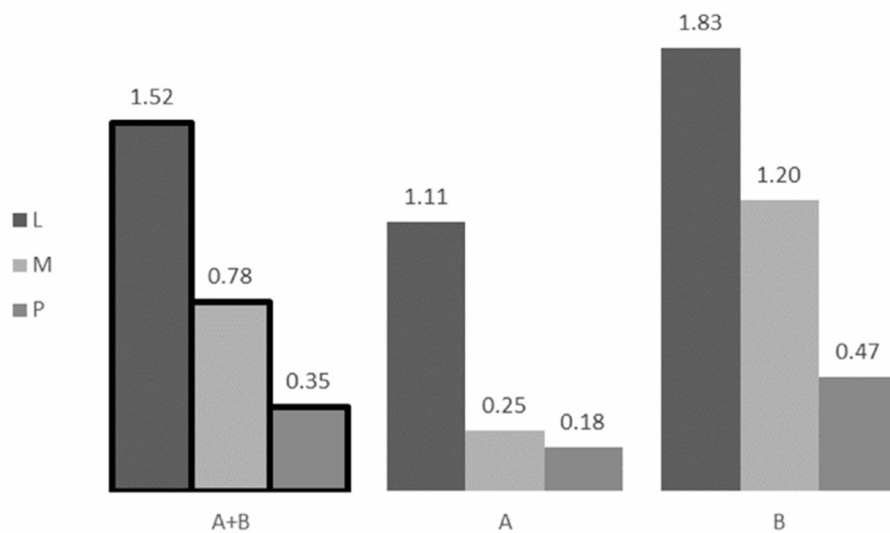
1a:

5

Example 2.33a. The “Evocation of the Ancestors,” parsings 1a and 1b



Example 2.33b. The average metric displacement values for parsing 1a



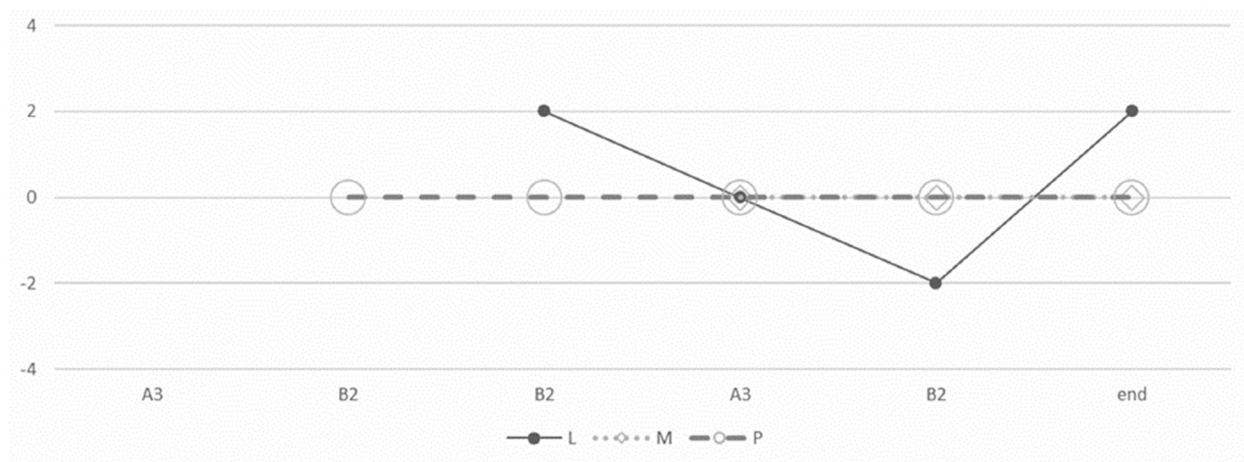
Example 2.33c. The average metric displacement values for parsing 1b

motives with distinctive beginnings are more easily and quickly recognizable than those with distinctive endings. This motive B begins with another pitch C, and is therefore not recognizable instantly; we require a second pitch D to clarify both the rhythmic duration of the first C and the change of pitch that signals the conclusion of B—in other words, B is only recognizable as it is ending. We might posit a

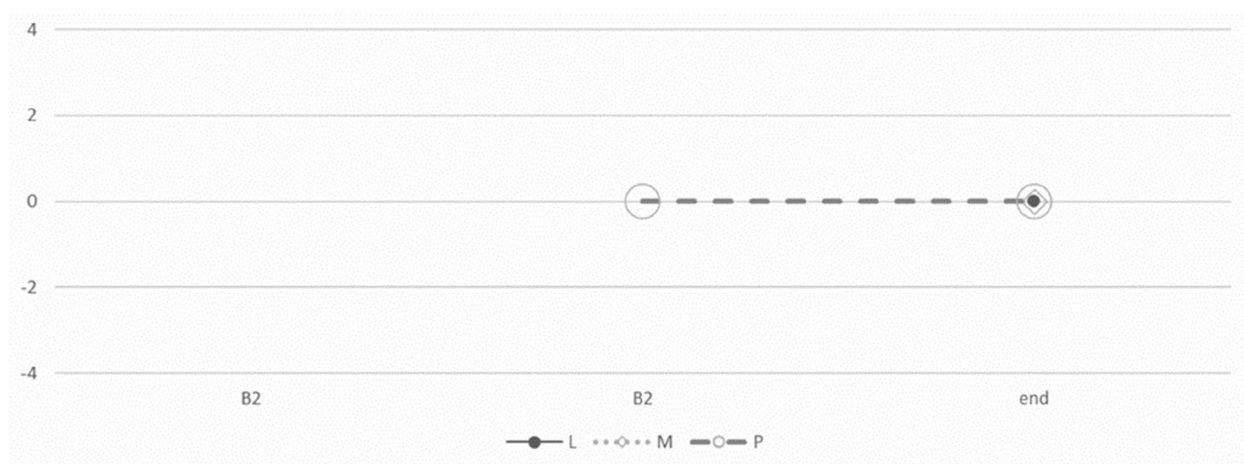
variant which is less well-defined but potentially more plausible for other reasons: parsing 1b, in which motive B is initially a larger four-unit amalgamation. The difference between 1a and 1b is subtle, but important for the listening experience; 1a features a small unit that is frequently replicated, while 1b presents a larger unit that is often truncated.

The average metric displacement values for parsings 1a and 1b are given in Examples 2.33b and 2.33c, respectively.⁴¹ Parsing 1a produces more accurate predictions in every segment under all three methods (local Inertia (L), motivic Inertia (M), and prototype (P)). Indeed, 1b provides a predictive advantage in one place alone: the B₄ motive that occurs at the end of segment 3 is correctly predicted with a displacement value of 0 (0d) under L, M, and P (LMP), whereas the first of the two motives of its 1a counterpart, B₂B₂, is incorrectly anticipated under L (-1d); this is a result of the preceding A₄ motive. The second B₂ is correctly predicted under LMP, but this advantage is minimal. I have proposed that longer motives provide greater stability when correctly anticipated, as they allow the listener to gain entrainment control over a longer span of time. Therefore this hypothetical advantage of 1b is thwarted by the lack of successful predictions under LMP. Given a more familiar listener, it seems likely that the 1a parsing might evolve into 1b over the course of repeated hearings as an intermediate step on the way to complete predictive mastery (in which B₂ and B₄ instances would be fully disentangled from one another and predicted separately). Yet within an LMP framework, given the clear disadvantages of 1b, I will focus this analysis on 1a exclusively. To show how I arrived at these average values, and to examine the detailed expectational experience of each segment, Example 2.34a-d presents a breakdown of metric displacement calculations for the 1a parsing for all four unique segments under L, M, and P expectational approaches.

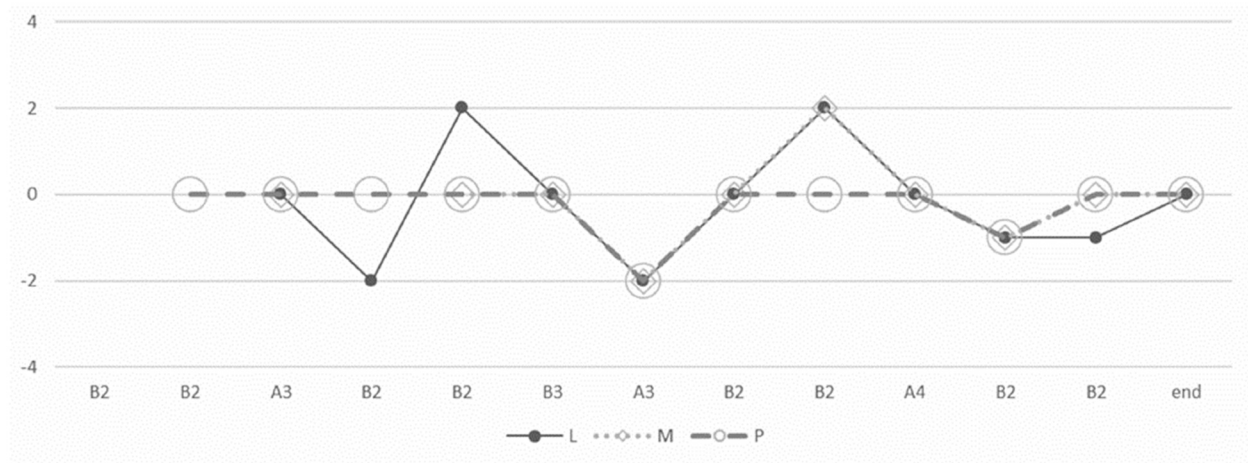
⁴¹ Note that, for this and all remaining parsings of the “Evocation,” the maximal displacement value is 2 rather than 3, since only two pulses are generally present (quarter-note pulse and half/dotted half-note pulse).



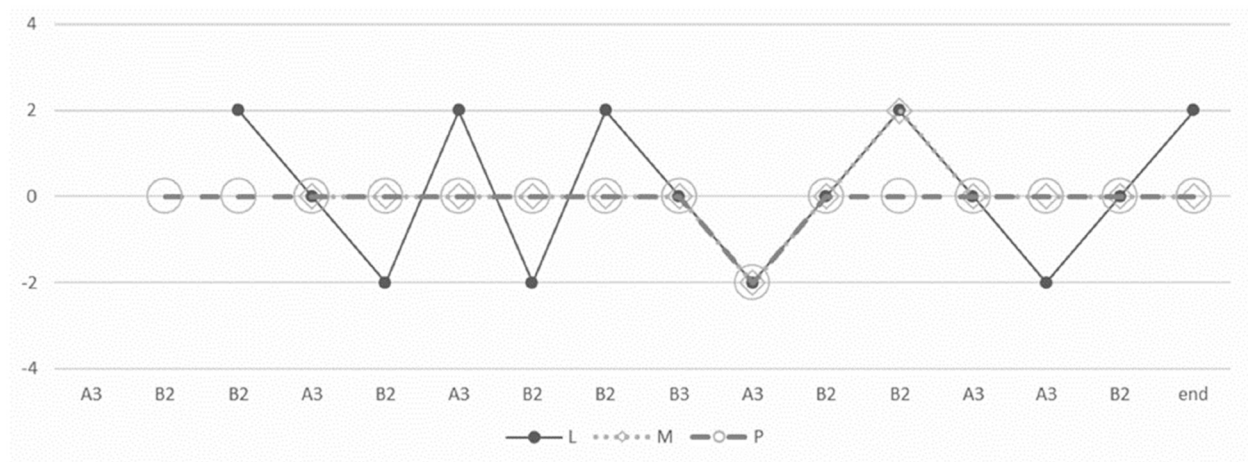
Example 2.34a. The metric displacement values for the “Evocation of the Ancestors,” parsing 1a, segment 1



Example 2.34b. The metric displacement values for the “Evocation of the Ancestors,” parsing 1a, segments 2 and 5



Example 2.34c. The metric displacement values for the “Evocation of the Ancestors,” parsing 1a, segment 3



Example 2.34d. The metric displacement values for the “Evocation of the Ancestors,” parsing 1a, segment 4

Reviewing Example 2.34—and as well as the average values given in Example 2.33b—it’s clear that L expectations produce significantly less accurate results than those of M and P, which are much closer to one another in terms of predictive accuracy. Segment 1 (Example 2.34a) sets these relations in stark relief; whereas M and P correctly predict every motivic arrival, L produces one accurate expectation out of four; the rest are the maximal value of 2d, with a maximally-even distribution of early and late failings. No clear patterns emerge from the displacement values; the total effect is one of

haphazard predictive errors. Turning to segment 3 (Example 2.34c), the relation is similar, though more complex. L predictions are again highly irregular: four are accurate, four are late, and two are early. There is a definite shape to the expectations across the segment; the first two-thirds feature nearly regular alternation between 1) accurate and inaccurate predictions; and 2) among those predictions that are inaccurate, late and early predictions at maximal displacement values. This high state of disruption changes after the A₃ segment 3, statement 7, as all subsequent statements are duple. This leads to a final portion of increased stability, wherein displacement values are the reduced 1d (and -1d). M and P then offer steady improvements that chip away at the inaccurate predictions: M corrects statements at the beginning and end of the segment, while P fixes the first A₃ instance and the B₂ of segment 3, statement 8.

Potentially more interesting are those statements that are not correctly predicted under any expectation scheme: the B₃ of statement 6 and the A₄ of statement 10, both of which are slightly longer than anticipated under any method. The B₃ is particularly difficult, occurring as it does after two iterations of the normative B₂ form. Only rote memorization can aid in the entrainment of this moment; furthermore, successful prediction requires the listener remember exactly how many B statements occur before the variant B₃ emerges. Thankfully, predicting B₃ provides the twofold advantage of also preparing the listener inertially for the A₃ that immediately follows. B₃ is also foreshadowed somewhat by the A₃ of statement 3. The other always inaccurate statement, A₄, is both more and less difficult: more because it is the only quadruple statement in this segment (and indeed in the entire scene), but less because it is surrounded by duple statements that lessen the displacement values of the inaccurate prediction, as discussed above. Finally, we see that the fourth segment again reinscribes the same set of relations between L, M, and P: L performs extremely poorly, M corrects nearly all of its inaccuracies, and P provides a few slight fixes above and beyond that inertial approach. Specifically, P gives predictions for the first two statements where M does not—which turn out to be accurate, given the normative

opening of the passage. It is the same set of motive statements that created issues in the third segment that continue to present problems here, especially the lone B_3 that again defies all expectation-generation methods.

We need not break down each parsing strategy with this level of detail; subsequent parsings will be shown in notation and average displacement values alone, as in Example 2.33. Parsing 2 is somewhat more plausible than parsing 1, and is notated in Example 2.35a, with average displacement values in Examples 2.35b and 2.35c. This parsing features a duple A motive, which, because of binary preference, is more likely to be experienced by most listeners than the triple A of parsing 1. In parsing 2, duple is suggested by, in addition to duple bias, the duple duration of the initial half note relative to the quarter unit pulse. Motive A is a very indistinct, weak element in this parsing; in every instance it features only a single note onset event which spans two—sometimes three—units. In contrast to this almost non-motive, B takes on a life of its own with a number of varied presentations that are triple as often as they can be, and duple when necessary so as to create the most normative versions of A and B. The duple/triple distinction between A and B helps keep the motives separate but, as in parsing 1, motive B is again defined (weakly) by a concluding pitch D rather than a strong initiatory gesture. Yet the durational distinction between the versions of the pitch C that begin motives A and B—half and quarter notes, respectively—further helps distinguish the motives from one another, and requires waiting only until the timepoint that initiates the second quarter pulse for this distinction.

I also suggest an alternate rendition of parsing 2—version 2b—in which the listener notes the very frequent ordered succession B_3B_2 , creating a higher-level motivic unit B_5 (32). This pattern is so consistent that its predictions are notably more accurate under M and P as those of version 2a, as shown in the average value chart of Example 2.35c. Overall, these charts make clear that parsing 2 is much more difficult to entrain for a new listener than was parsing 1. We had noted that 1b was a predictively inferior variant of 1a; indeed, both 2a and the 2b variant produce poorer predictions,

parsing 2b: B₅
 parsing 2a: A₂ B₃ B₂ A₂ B₃

1 ♩ = 144

2b: B₅
 2a: B₃ B₂

2

2b: B₅ B₃ B₂ A₂ B₃ B₂ A₃ B₂
 2a: B₃ B₂ A₂ B₃ B₂ A₃ B₂

3

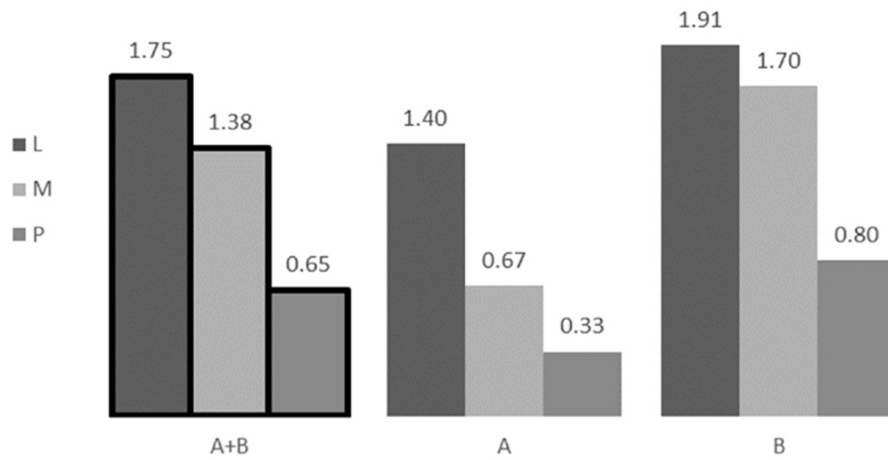
2b: B₅ B₃ B₂ A₂ B₃ B₂ A₃ B₂ A₂ B₃ B₂ A₃ B₂ A₂ B₃
 2a: A₂ B₃ B₂ A₂ B₃ B₂ A₃ B₂ A₂ B₃ B₂ A₃ B₂ A₂ B₃

4

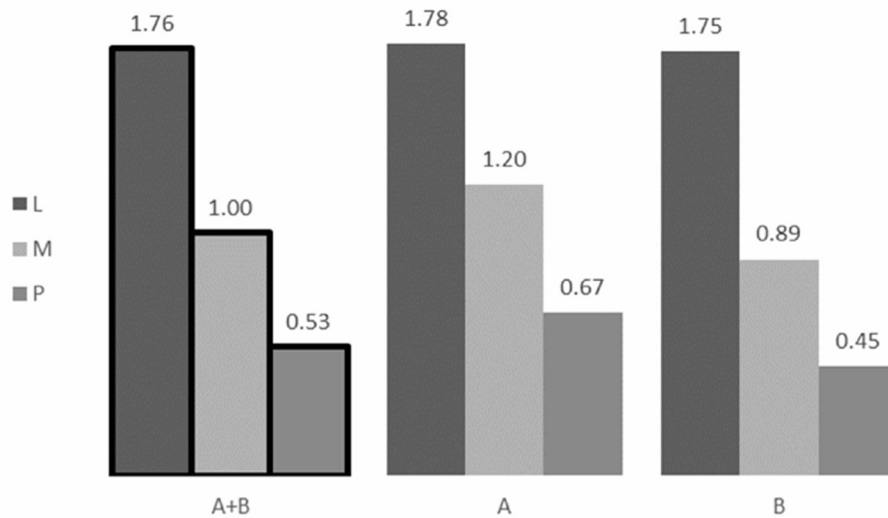
2b: B₅ B₃ B₂
 2a: B₃ B₂

5

Example 2.35a. *The “Evocation of the Ancestors,”* parsings 2a and 2b



Example 2.35b. The average metric displacement values for parsing 2a



Example 2.35c. The average metric displacement values for parsing 2b

though 2b is fairly comparable. This is due to the fact that, in 2a, the B_3B_2 pair always produces high metric displacement, while in 2b, A and B never present the same metric structure in sequence, creating significant problems for any inertial approach; indeed, L produces zero accurate predictions in parsing 2b across all four unique segments. There is the potential for a bit of inertial success, however, if motivic

recognition is minimal, as it may be in this loosely-structured motivic grouping approach. In both segments 3 and 4, there is an instance of $B_5B_3A_2B_5$. Given the end-defining distinction between motives A and B under parsing 2, the distinction between A_2 and B_2 is not significant. It's quite possible then that, for the sake of simplicity, the listener might combine the central B_3A_2 into a varied B_5 (B'_5), thereby creating a threefold quintuple statement $B_5B'_5B_5$; this would provide a boon for L, M, and P alike, and might therefore warrant masking the A/B distinction.

In parsing 3, shown in Example 2.36a-b, our listener submits fully to binary preference, preferring duple wherever possible. Under this method, triple groupings are allowed only when necessary so as to maintain motivic parallelism. Furthermore, it is only motive B that ever expresses triple structure, and then only in one-fifth of all of its instances. These B_3 statements are somewhat unlikely to be felt naturally, however, because of the syncopated rhythmic structure they present: a notated quarter note followed by a half note, pushing against the normative “prefer long durations early” metric preference rule.⁴² This is ameliorated somewhat by the fact that A and B are now fully distinguished in their initializing gestures: motive A always begins with the pitch C—as a half note in A_4 , and a quarter in A_2 , in which the second half only of A_4 is presented—and motive B always begins with D. Adding further clarity, half notes fall into two neatly distinguished categories: they either follow a quarter note D, in which case they are syncopated motive-concluding events, or they do not. In the latter case, they either initiate a segment, follow the note C, or follow a rest. In these cases, they initiate the full A_4 form of motive A.

As a first-level default, I am considering A_2 the prototypical form of motive A in parsing 3. It is the most numerous motive form at 7 instances, whereas A_4 appears 5 times. The difference here is not significant, and, as discussed above, other factors are relevant to prototype form determination besides simple frequency. In cases of similar number of occurrences, as here, these other factors rise to the fore.

⁴² Lerdahl and Jackendoff, *A Generative Theory of Tonal Music*, 84.

parsing 3: A_4 B_2 B_3 A_2 B_2

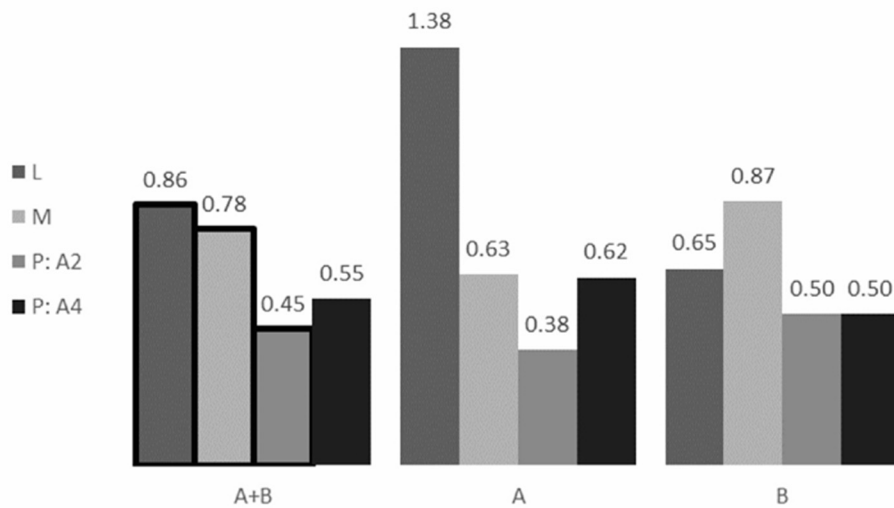
3: A_2 B_2 B_2

3: A₂ B₂ B₃ A₂ B₂ B₂ B₂ A₄ B₂ B₄ A₂ B₂ B₂

3: A_4 B_2 B_3 A_2 B_3 A_2 B_2 B_2 A_4 B_2 B_4 A_4 B_3

3: A₂ B₂ B₂

Example 2.36a. The “Evocation of the Ancestors,” parsing 3



Example 2.36b. The average metric displacement values for parsing 3

First, there is primacy: A_4 initiates segments 1 and 4, while A_2 begins 2 (and 5) and 3; the situation is again roughly comparable. In those cases where A_4 begins a segment, however, A_2 always follows closely behind. This creates a second factor, that of close internal relation between motive forms. Since A_2 is a contiguous subset of A_4 —one that, furthermore, respects the internal metric structure of that (22) superset—it's quite possible that a listener will interpret A_2 as a truncated form of that more prototypical, original unit. For these reasons, I have included metric displacement values for two different prototypical forms, A_2 and A_4 . Although I'm treating them as fundamentally distinct in the parsing 3 displacement averages of Example 2.36b, it's quite possible that a listener might switch between these over the course of a single hearing.

Looking at the big picture, the most notable benefit of parsing 3 is the massive boon it gives L over other methods. This is the result of the primarily duple nature of motive form statements in this parsing, causing most inaccurate motive A predictions—and there are many—to result in metric displacement values of 1d rather than the full 2d. Motive B does particularly well under L with an average value of 0.65d, lower than its own M value of 0.87d (and nearly all M values we have seen in all

parsings so far). Indeed, this is the first (and last) case we will see in the “Evocation of the Ancestors” where moving along the predictive development track from L to M or M to P leads to a *decrease* in average predictive accuracy. This results primarily from an identical spot in segments 3 and 4 (statements 5 and 7, respectively) where a B₂ statement directly follows A₂, leading to an accurate L prediction. In both cases A₂ is itself preceded by the relatively uncommon B₃ form of B, though, leading to incorrect predictions of B₂ under M.

Another clear observation emerging from Example 2.36b is the relative superiority of the A₂ strategy over the A₄ variant. This is an interesting case given that, as noted above, it’s unclear which form will rise to the surface, and when. In a first-time listening experience, the listener will not be able to employ P from the outset of segment 1 when that first A₄ has primacy over A₂. Assuming the transition occurs at some central section, it’s worth noting that A₂ achieves primacy here, initiating both segments 2 and 3. If, however, a general P strategy had not been executed prior to segment 4, the primacy and size of A₄ at that opening might steer the listener towards that ultimately inferior strategy; yet, if deployed at this particular moment, an A₄ prototype approach would serve the listener well, despite inferior average values: segment 4 contains 3 statements of A₄ and 2 of A₂. The particular sequencing of these forms is also notable: A₄ initiates, asserting primacy, and is closely followed by two statements of A₂, separated from one another by only a single B motive statement. This sequencing near the opening of segment 4 will doubly reinforce the relative importance of the A₄ form. A motives then appear twice again in the final third of this segment, both A₄. That lone A₂ of segment 5 then simply serves to throw a final wrench in the predictive spokes.

Finally, in parsing 4, presented in Example 2.37a with displacement averages provided in Example 2.37b, we arrive at what I take to be the most plausible of the four possible motive parsings. This version features nearly all of the features that contributed to the relative plausibility of previous parsings: initiatory rather than concluding distinctive features (the pitch C for motive A, D for B),

parsing 4:

1 $\text{♩} = 144$

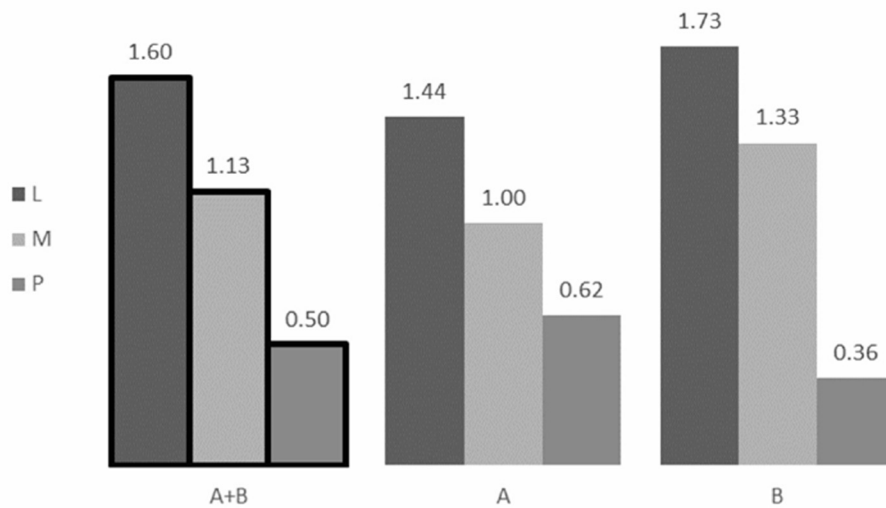
2

3

4

5

Example 2.37a. The “Evocation of the Ancestors,” parsing 4

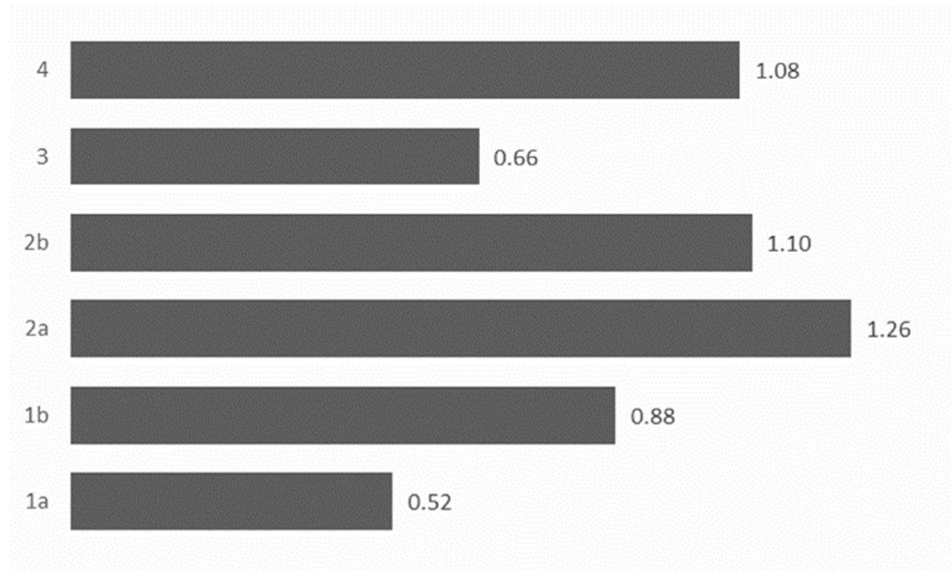


Example 2.37b. The average metric displacement values for parsing 4

differences of metric structure (A is typically duple, B triple), and, resultantly, an absence of “forced” motivic distinctions that are not clearly suggested, as were those of parsing 1. Even more crucially, parsing 4 features the most distinctive “character” for each motive, owing to the coordination of all of the above factors, which persists across durational variations. As noted above, the parent/child relationship between A_4 and A_2 , respectively, is clear, and these two forms account for nearly all motive statements across all segments. B begins invariably with the pitch D, and takes the triple form B_3 almost without fail—the only exceptions are the significant events which I’m labeling B_6 in parsing 4. One can certainly imagine a listener in this context hearing these forms in duple groups of quarter notes, as in parsing 3 (and, for the most part, parsing 1). Yet I think the significant difference between A and B—resulting from their distinctive individual characters—is sufficient to overpower the implied duple structure. After all, the first three notes of B_6 (hereafter $B_{6.1}$) are the primary version of B_3 exactly; the first-time listener has no choice but to perceive triple groupings from the outset. The final three notes of B_6 ($B_{6.2}$) are then less clear. It seems that one of three options is most likely, from a motivic grouping perspective. Not recognizing $B_{6.2}$, the listener either 1) retrospectively reinterprets all of this motive

statement with duple quarter structure as (222), forming in essence a new motive, C_6 ; 2) having just heard triple grouping in B_3 ($B_{6.1}$), projects another triple group forward and hears $B_{6.2}$ as B'_3 , a new motive form with identical metric structure but quite different contour and pitch content; or 3) given the dissimilarity of $B_{6.2}$ from any motive seen before, remains in a state of suspended judgement until the familiar A_4 appears (as it does following both statements of B_6). They then conglomerate $B_{6.2}$ onto the end of $B_{6.1}$, creating a new motive form, B_6 . I think the material of $B_{6.2}$ is weak enough, and appears late enough in the scene, that, rather than acquiring unique motivic force of its own or creating a significantly new motive form of B , will become subsumed within existing motivic structures, resulting in the creation of the B_6 form.

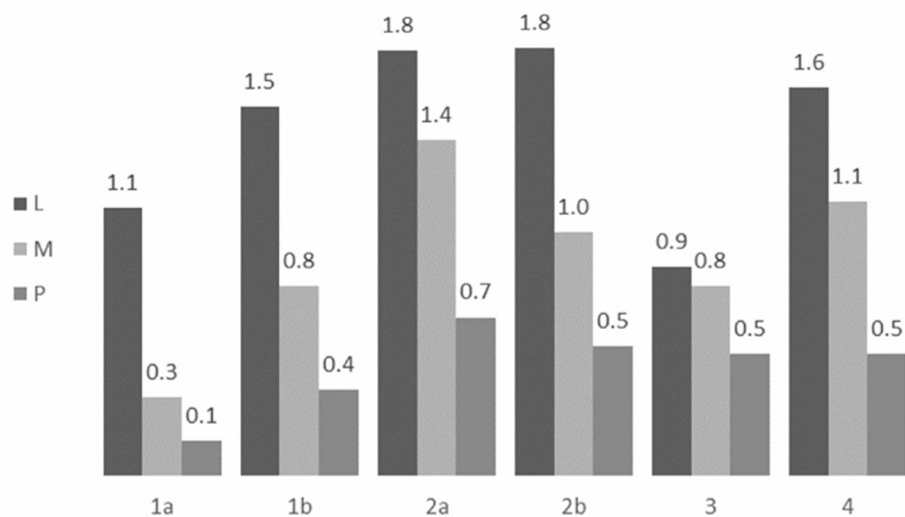
Having considered some general features of our four versions (and attendant variants), let's take a step back to consider what can be learned by comparing and contrasting the resultant predictive information. Metric displacement values for L, M, and P are averaged together to produce a single metric displacement value for each parsing strategy, presented in Example 2.38. Taking the "a" variants of versions 1 and 2, as suggested by the preceding analyses, we see a rough negative correlation between parsing plausibility—as reflected in version number, wherein lower numbers are less likely—and average metric displacement value. The outlier to this trend is version 2a, which has the highest average displacement of all at 1.26d. This pattern seems initially counterintuitive: shouldn't "better" listening strategies be "better" in every respect? What does it mean for the listener if implausible solutions are better predictors than their more likely counterparts?



Example 2.38. The average metric displacement values for each parsing, averaging together L, M, and P

We will return to these questions in a moment. It's worth first considering whether the total LMP average values of Example 2.38 are a good representation of the overall predictive effectiveness of a particular parsing strategy. The primary question is whether L, M, and P should be equally weighted in this and subsequent analyses. Do they present an equal bearing on the listening experience, or are certain expectation sources more consequential? In order to more readily compare expectation strategies for each parsing, L, M, and P are disaggregated in Example 2.39, making it easier to see the strengths and weaknesses of each version's prediction sets. Yet determinations of relative significance are quite difficult here, owing to the twofold nature of local inertia's significance. While L does, as I have argued, act as a genuine first source of metric expectations for the unfamiliar listener, this phase ends very quickly. The moment the listener begins to grasp the identity of each motivic unit, motivic inertia begins to take over. Yet L is never fully gone. Even when a listener is deriving expectations from a temporally distant past event (under M or P), they are necessarily still shifting from whatever most recent entrainment pattern they were just engaged in. Thus, L is eternally present on the level of entrainment shifts, even for an end-state listener who has fully learned the metric/motivic sequence of

an MDM passage and predicts all statements successfully. Whereas metric displacement values for L, such as those given in Example 2.39, are accurate representations of the listener's experience when using L as an expectation source, they do not remain relevant in this later phase of continuing inertial-based transitions between successive meters once the listener is deriving explicit temporal predictions from M or P. At this point, Gotham's metric relations communicate more about the extent to which adjacent inertial transitions do or do not feel smooth. Despite the importance of L, then, the significance of the L displacement values in Example 2.39 is minimal.

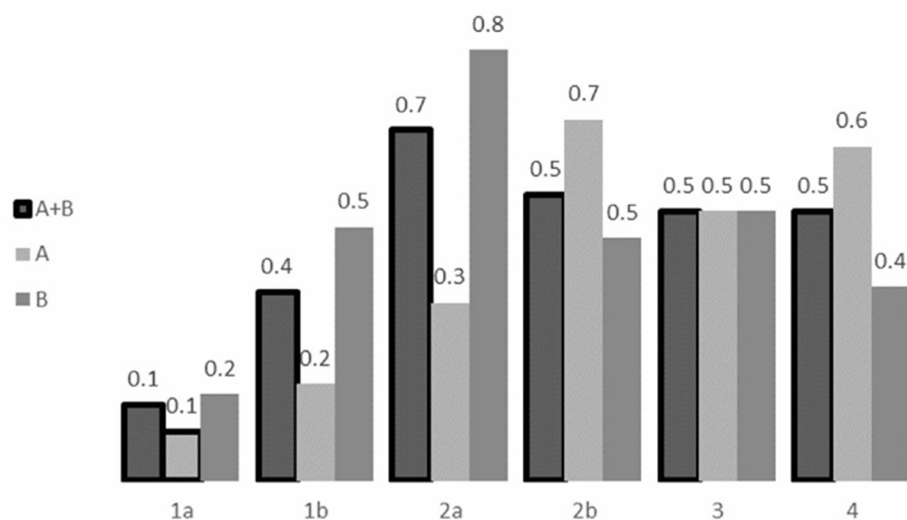


Example 2.39. The separate average metric displacement values for L, M, and P for each parsing

If local inertia metric displacement values are less prominent and, as a result, less significant to a total appraisal of the various listening strategies, what of the second stage, motivic inertia? The criteria for passage out of M and into the prototype stage is more stringent than that that from L to M: the recognition of motivic identity and the formation of a prototype motive form, respectively. This suggests that a listener will tend to spend more time in L than in M. Yet M is ultimately transitory; as the listener is learning the identity of each motive, they are simultaneously also learning attendant metric information. By the time M is achieved, it is already in the process of dissolving on the way to P. This P

stage, on the other hand, has real longevity; it marks a potentially stable state within the larger learning process that extends even beyond the first-time encounter that is the focus of this analysis. Indeed, something as general as a single prototypical impression of each motive is something that may easily persist though time and across many listening experiences. Even as specific form statements are subsequently learned, embellishing a P approach, these further developments may be forgotten or misremembered, in which case a P form-level understanding may act as a stable foundation to fall back on, underscoring the continued usefulness and longevity of this expectation-generation method.

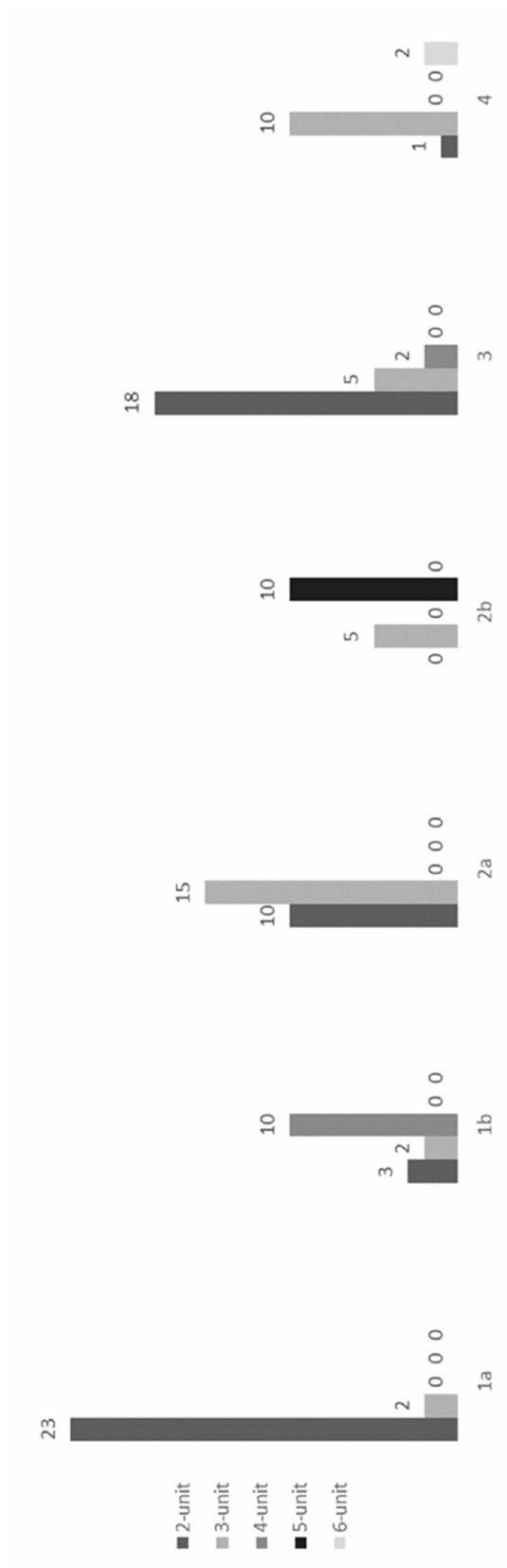
If P is the most stable and long-lived of the expectation-generation methods discussed here, it makes sense to weight it more heavily than L or M when evaluating competing approaches to the same passage, as in the “Evocation of the Ancestors” segments. For this reason, let’s focus in on only the P numbers in Example 2.39. The loose negative correlation between plausibility and metric displacement noted in the single averaged LMP values of Example 2.38 is reinforced here, though the picture is somewhat more complex when we disaggregate the displacement values for the two different motives, shown in Example 2.40. Here we see the negative correlation in even sharper relief for motive A, which



Example 2.40. The average displacement values for the prototype (P) approach for both motives for each parsing

presents a mostly smooth ramp all the way from parsing 1 to 4. Motive B is somewhat more complex; the reason for the disrupting spike in the parsing 2 P values is clear: parsing 2a puts all of the tension between duple and triple on the B motive, relegating motive A to a simple duple half note onset. Parsing 2b introduces a significant improvement to the understanding of the B motive (creating B₅), and this improvement is reflected here in the notably improved P value in Example 2.40. Taking parsing 2b over 2a, the outlier is removed and we see a fairly smooth increase of displacement values for motive B from parsing 1 to parsing 3 (0.16d, 0.45d, 0.5d); parsing 4 then returns to a relatively low value of 0.36d). These numbers make sense given the relative burden that is placed on B in each parsing, as broken down in Example 2.41: all parsings that fit B into primarily one grouping scheme feature lower displacement values than those that give it multiple forms. Among the latter, the strategy that prioritizes one of two options over the other (parsing 3) does better than that which gives equal weighting, as in parsing 2a. Among the former, predictive success is roughly correlated with motive length (4-unit and 5-unit versions are nearly identical).

Returning at last to the question of negative correlation between plausibility and predictive accuracy, we must consider the ultimate experiential consequences of the information gathered here. I argue that, because of the way it denies the listener any one demonstrably superior predictive solution, this negative correlation is the primary reason for the significant metric difficulty of the “Evocation of the Ancestors” scene. Intuitive, plausible metric parsing strategies produce poor predictive results, disincentivizing their continued pursuit, while options that feel much less natural or plausible produce more readily entrainable metric structures. This may well create a back-and-forth phenomenon wherein a listener feels continually pulled in competing directions, pursuing one parsing because it works temporarily under an inertial approach, then abandoning it for another more immediately alluring framework, and so on. Multiplicity of options may be a good thing when one or a small number of those options readily rise to the surface and assert their superiority, but when plausibility and predictive



Example 2.41. The distribution of motive forms for motive B for each parsing

accuracy seem to cancel out one another, the listener may feel helpless, flitting endlessly between available options as they rise to the fore in turn, without easily gravitating into a stable parsing strategy upon which the listener can build an understanding beyond the prototype stage. The metric displacement method, alongside the L, M, and P expectation sources, have highlighted some of the features that make this scene feel so very unpredictable.

This chapter has introduced or repurposed a number of interrelated techniques designed to provide the analyst with the means to explore MDM musics from an experiential perspective. Each tool engages with a distinct aspect of the listening process, and taken together, they enable an examination of multiple distinct phenomenological features. The variability index and Gotham's metric relations provide information about the entrainment difficulty of meters and connections between meters, respectively, in the abstract, while metric displacement assesses the unpredictability of a passage of MDM from an experiential, real-time perspective. Furthermore, using the expectation-generation methods of local inertia, motivic inertia, and prototype forms as a guide, an analyst is able to gain insight into how a listener's understanding of a passage may develop over time as motivic materials become increasingly familiar.

The short vignettes that constitute this chapter were sufficient to introduce the techniques that underpin my analytic approach, but none of the passages considered so far have been particularly substantial in scope. In the next chapter, I delve into extended passages of Stravinsky's MDM, demonstrating the full analytic payoff of the tools introduced here. In Chapter 4, I then analyze excerpts by a diverse assortment of composers and songwriters, highlighting the broad applicability of these techniques. As the analyses of these following chapters make clear, not all of the tools presented in this chapter will be relevant all of the time; rather, the careful analyst will thread these techniques together in

sensitive ways, attending always to the experiential significance of the moments to which these tools provide deeper access.

CHAPTER 3 | METER, MOTIVE, AND FORM IN STRAVINSKY'S LARGE-SCALE WORKS

This chapter undertakes two interrelated goals. Whereas Chapter 2 introduced a multi-part analytic system and highlighted its effectiveness at experiential description of relatively short excerpts, the present chapter applies these same tools to study the experiences afforded by extended passages of Motive-Directed Meter. The main body of this chapter consists of three longform analyses, each of which confronts distinct problems in the perception of large-scale MDM organization in the music of Igor Stravinsky. The first explores the final “Sacrificial Dance” scene of the *Rite of Spring*, highlighting attendant issues of motive groups or “supermotives” and the role that such larger structures play in metric expectation. Second, I analyze another scene from the *Rite*, the “Glorification of the Chosen One,” which, although expressing extremely clear metric boundaries, exhibits ambiguities of motivic identity that necessitate the comparison of multiple approaches, as in the study of the “Evocation of the Ancestors” featured in Chapter 2.¹ Finally, I study the first movement of the *Song of the Nightingale*, the “Feast at the Emperor’s Palace,” which reveals how the loosely motivic organization of the movement pushes my analytic technology into new territory, showing how a sense of motive may be defined by less clearly-specified parameters such as timbre and contour. The “Sacrificial Dance” and “Glorification” scenes have received prior analytic attention, primarily by Pieter van den Toorn and Pierre Boulez, but the analyses presented in this chapter approach these works from a new perspective, as summarized in the reviews of this literature featured below. The metric structure of the “Feast at the Emperor’s Palace,” on the other hand, has not been studied; the final part of this chapter therefore helps to fill a

¹ However, unlike the “Evocation,” metric groupings in the “Glorification” are unambiguous.

significant gap in Stravinsky scholarship.² Taken together, these three analyses present a new experiential perspective on Stravinsky's rhythmic and metric techniques.

Chapter 2 presented a set of analytic techniques in reference to several brief excerpts of Stravinsky's music. Those tools included: 1) the variability index, coordinated with durational span, which describe the entrainment difficulty of each metric unit in isolation; 2) select representatives of Mark Gotham's metric relations, which capture the complexity of connections between adjacent metric units; and 3) the "metric displacement" system, which describes degree of mismatch between metric expectations and realizations, alongside three systems for determining generalized expectation sets (local inertia, motivic inertia, and prototype motive forms).³ Whereas, presenting each of these techniques in succession, Chapter 2 maintained some degree of compartmentalization between them, the present chapter weaves together information derived from each of these systems where relevant to arrive at a holistic picture of the real-time metric experience of each piece. Furthermore, although each of the analyses of Chapter 2 were, as a result of their brevity, able to present fairly comprehensive summaries, the sheer scope of the works featured in this chapter preclude such exhaustiveness. Instead, my goal throughout will be to highlight musically significant moments in order to better understand the perceptual consequences of distinct types of coordination between metric and motivic organization.

I. THE *RITE OF SPRING*: "SACRIFICIAL DANCE"

As the final scene of the *Rite*, the "Sacrificial Dance" is a powerful punctuation that wraps up Stravinsky's ballet with a frenzied fervor unmatched at any prior point in the work. It is no coincidence

² *The Song of the Nightingale* (1917) is an arrangement of material from Stravinsky's earlier 1914 opera *The Nightingale*. The metric structure of the original opera has, to my knowledge, likewise not yet been systematically studied.

³ See Mark Gotham, "Meter Metrics: Characterizing Relationships among (Mixed) Metrical Structures," *Music Theory Online* 21, no. 2 (2015).

that this scene also presents the most prototypical example of Motive-Directed Meter in all of the *Rite*, or indeed in Stravinsky's entire oeuvre. The frantic rhythmic energy of this scene, in which the chosen sacrificial victim dances themselves to death in front of the onlooking elders, has attracted musical-analytic attention from several scholars of musical rhythm. Before digging into the details of my experiential analysis of this movement, it's worth reviewing this literature so as to better understand how my approach participates in the ongoing dialogue about this difficult music.

There is certainly no shortage of writings about the *Rite*, and yet, as Kathy White notes, much of this literature—even that of an explicitly rhythmic-analytic orientation—is straightforwardly descriptive in nature.⁴ Indeed, scholarship that engages critically with the temporal organization of the “Sacrificial Dance” is somewhat scarce. That which does is often extremely structuralist in design; take, for example, James Siddons' uncovering of so-called “arch forms” within several sections of the scene; his depictions of these patterns are reproduced in Example 3.1.⁵ Although a listener will be able to follow these patterns once attention has been drawn to them, the temporal distance and inversive nature of the relations ensures that they will pass unnoticed to most observers, who are likely to be focused on the relentless succession of motives and the labor of predicting future motive onsets.

This problem is even more pronounced in Boulez's rhythmic analysis of the *Rite*, which contains an extended analysis of the “Sacrificial Dance.” An excerpt from his analysis exemplifies his descriptive style:

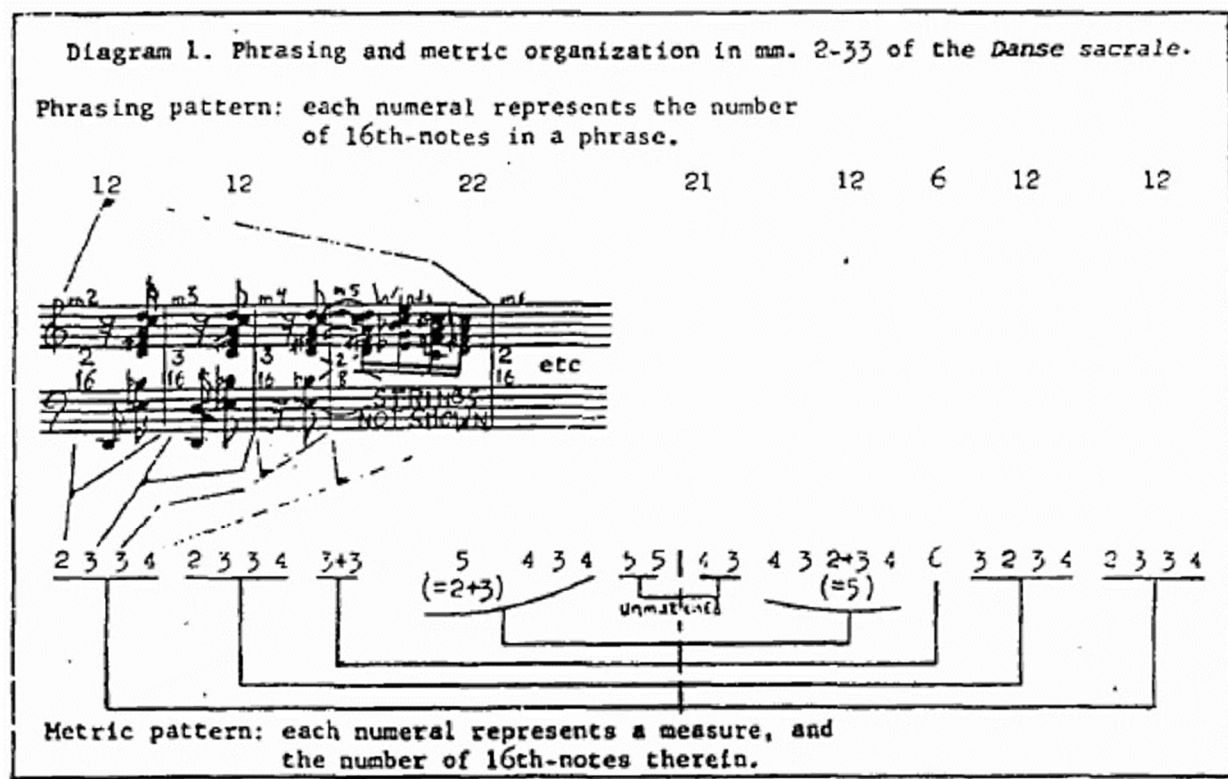
It will be noticed that whereas [motives] A and C vary irregularly, B includes only two fixed values B₇ and B₄, the second coming as an elision of the first.

In the first period, one will note the symmetrical disposition A₃ | A₅B₇, on the one hand, A₅B₇ | A₃ on the other.

⁴ Kathy Maria White, “*The Rite of Spring: A Rhythmic Perspective*” (Washington University, 1987), 4.

⁵ James Siddons, “Rhythmic Structures in *Le Sacre du printemps* (Danse sacrale),” *Musical Analysis* 1, no. 1 (1972): 8.

The second period utilizes A_4 , a contraction of the element A_5 as it appeared in the first period; and a form A'_5 derived from C_8 .⁶



Example 3.1. An arch form in the "Sacrificial Dance" from the *Rite of Spring* by Igor Stravinsky (Diagram 1; Siddons, 1972)

In the first paragraph the author references and expands upon an observation featured at the opening of his teacher Olivier Messiaen's *Technique of my Musical Language*, wherein that composer observes in the opening bars of the "Sacrificial Dance" "One of [Stravinsky's] most striking procedures, the augmentation or diminution of one rhythm out of two."⁷ In the second, Boulez observes the same kind of symmetry as did Siddons, the perceptual significance of which is suspect. Finally, he describes a

⁶ Pierre Boulez, *Notes of an Apprenticeship*, trans. Herbert Weinstock (New York: Alfred A. Knopf, 1968), 127.

⁷ Olivier Messiaen, *Technique of My Musical Language* [Technique de mon langage musical], trans. John Satterfield (Paris: A. Leduc, 1956), 14.

process of motivic derivation, without concern for the temporal flow in which these derivations are situated or the means by which the motives are perceived to become transformed and develop in the course of the scene's unfolding. Boulez's priorities seem to be with the score and the composer; and so, although we agree on the identity and span of several musical motives, our analytic efforts move in quite different directions.

Boulez's and Siddons' analyses are representative of a substantial portion of literature on the *Rite*. Such writings introduce new listening technologies, teaching the educated listener how they might listen if they exert the right effort towards the right features. This is certainly important work that enables us to experience the works we know and love—such as the *Rite of Spring*—in new and unforeseen ways. Yet ultimately these approaches present experiences that are beyond the reach of many listeners who do not have the musical training necessary to enact them or, if they did, would be unlikely to ever have access to these academic materials from which to learn the methods. Such “listening technology” approaches therefore might be seen to represent a kind of musical elitism, offering privileged access to works of art.

The approach taken in this dissertation, as described in Chapters 1 and 2, is non-prescriptive, seeking instead to describe the experience of the broadest possible range of listeners. Pieter van den Toorn presents something of a middle approach between these poles, using an excerpt from the “Sacrificial Dance” to argue for his “background periodicity” concept.⁸ Noting the metric irregularities of the opening measures of this scene, he argues for a “hidden” consistent meter underlying the passage, suggesting that a “Concealed 2/8 periodicity emerges with little resistance, especially in view of the immediate, verbatim repeat of the *a5-b7* succession and its higher-level 1-2-3 count.”⁹ Van den Toorn's

⁸ Van den Toorn's “background periodicity” was discussed in Chapter 2.

⁹ Pieter C. van den Toorn, “Stravinsky Re-Barred,” *Music Analysis* 7, no. 2 (1988): 190.

diagram of this consistent metric frame is reproduced as Example 3.2.¹⁰ Supporting van den Toorn's interpretation is the coordination between inertia and parallelism seen in the first two systems of his figure; after this point, the forces diverge and the listener must privilege the inertial or the parallelistic. Yet even within the opening systems the inertia/parallelism tension is present; van den Toorn notes that a listener is *able* to pursue the inertial in this one particular passage, but doing so requires specific metric profiles for his motives *a* and *b*. While plausible, I will argue for different metric interpretations below that preclude the possibility of consistent meter.

As noted above, Kathy White laments—rightfully, I think—the shortage of analytic work on the *Rite* that rises above the level of the descriptive. The most significant product of her work is her measure of “rhythmic tension,” which she graphs relative to each of the scenes of the *Rite*—her graph of the “Sacrificial Dance” is reproduced as Example 3.3.¹¹ This depiction is a tantalizing representation of tension *as experienced by the listener*, marking it as strikingly different from the structuralist accounts considered so far. Although suggestive, rhythmic tension lacks systematicity, resulting instead from White's impressions of a number of separate parameters:

Rhythmic “stage” or rhythmic tension is a complex, abstract quality which is not measurable in objective units. Instead it is the result of the interaction of a number of different measurable, observable elements including density, irregularity of pulse, insistence of pulse, orchestration, and dynamics. The following chart is a simplification and reduction to consider these various elements as a single variable phenomenon [sic]. Although such a chart may necessarily be subjective and intuitive to some extent, nevertheless it has heuristic value because we are able to clearly express and compare a dynamic form or shape within the work that would otherwise be difficult to perceive.¹²

¹⁰ Ibid., 189.

¹¹ White, “*The Rite of Spring: A Rhythmic Perspective*,” 229.

¹² Ibid., 169.

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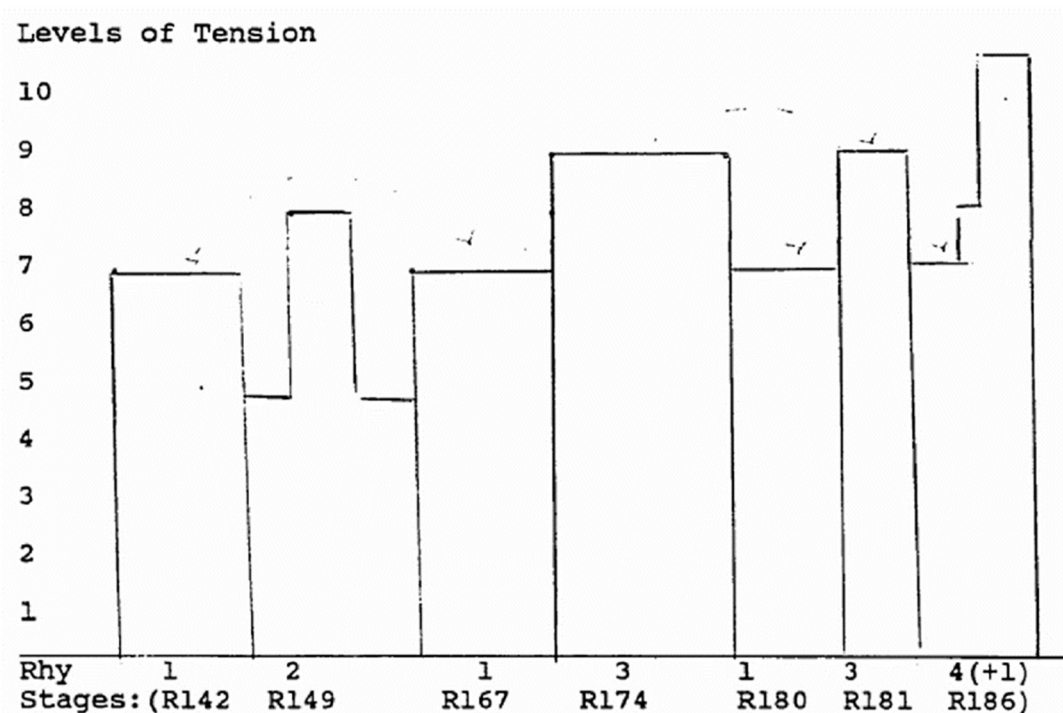
145 + 2

a_5 b_7 a_4 b_7

Example 3.2. Van den Toorn's "background periodicity" in the "Sacrificial Dance" (Example 21; van den Toorn, 1988)

In general, White focuses upon important parameters—"irregularity of pulse" and "insistence of pulse," in particular, seem especially pertinent to "rhythmic tension," and indeed the overall listener's experience of these scenes. Yet none of the individual elements are defined or systematized; neither are

the interactions between them. Although her conception of rhythmic experience has heuristic value, it's not clear how other analysts can apply and generalize her system.¹³



Example 3.3. White's view of "rhythmic tension" in the "Sacrificial Dance" (Illustration 38; White, 1987)

It would seem, then, that analytic literature on the "Sacrificial Dance" is split into two extremes: detailed structuralist analysis that does not concern itself with the experiential dimension, and subjective personal reflection that is suggestive but lacks the systematicity necessary to achieve generalizability. The following analysis attempts to fashion a bridge over this divide, engaging with structural particularities without losing sight of the metric experiences to which they give rise. I begin, like Boulez, with a recounting of certain general structural features, which provides the necessary context for the listener-oriented investigation that follows. A formal diagram of the scene's sections,

¹³ For another example of subjective, personal-reflective listener-oriented analysis of the "Sacrificial Dance," one which is concerned with choreography in addition to purely musical details, see Marianne Kielian-Gilbert, "Dissonant Bells: *The Rite's* "Sacrificial Dance" 1913/2013," in *The Rite of Spring at 100*, ed. Severine Neff, Maureen Carr, and Gretchen Horlacher (Bloomington; Indianapolis: Indiana University Press, 2017).

relative to the measure numbers of the original notation, is given as Example 3.4. The recurring X sections marks the most prototypical presentation of Motive-Directed Meter in all of Stravinsky's output; sections Y and Z, on the other hand, despite definite durational irregularities, are much more likely to evoke inertial responses in a listener. As a result, this analysis focuses on the recurring "refrain" section, section X. The first two instances of this material are nearly identical; the second, which I refer to as X', is a presentation of X transposed down a single semitone. It's unclear what the effect of this transpositional distinction will be; in any event, it would seem to have no bearing on the rhythmic/metric organization of the materials. For this reason, I will treat X and X' as functionally identical for the purposes of this analysis. XX, the third appearance of this material, is on the other hand notably distinct. It acts as a kind of "false start," initiating the same opening motive statements that began X (and at their original transpositional level), followed by a motive set drawn from the end of X, before abruptly ending. The extreme brevity of XX is such that it performs the bare minimum amount of work necessary to produce an overall rondo-like structure—the listener is reminded of X without actually experiencing it as a section proper. XXX, on the other hand, concludes the scene with an expanded and substantially transformed version of X. Therefore, although four sections of "X" material are shown in Example 3.4, as a result of the redundancy of X' and the brevity of XX, this analysis focuses primarily on the structure and experiential consequences of two sections, X and XXX.

Measures (notated)	Section
1-29	X
30-111	Y
112-140	X'
141-155	Z
156-161	XX
162-183	YY
184-241	XXX
241-243	Coda

Example 3.4. The form of the "Sacrificial Dance"

I have created a textural reduction of X-material sections of the “Sacrificial Dance,” which also re-bars the material according to the particular metric experience I investigate in this analysis. Notation for sections X, XX, and XXX are given as Examples 3.5a-c, respectively. As usual, motive identifying letters and numeric span lengths are provided above the staff. Let’s first interrogate my claim that these passages represent peak MDM prototypicality, addressing each of the four definitional components of MDM in turn.¹⁴ First, the unit pulse is very consistent throughout all of these passages; there are no written fluctuations of tempo, nor any explicit interruptions of the notated eighth pulse, such as eighth triplets.¹⁵ Second, there is indeed a significant amount of irregularity at higher pulse levels; Example 3.6 presents counts of the spans, counted in eighths, of all motive statements across all four X-material sections. This chart makes clear the significant amount of variation expressed across all statements; furthermore, although the 5-unit is clearly the most common duration, this span has irregularity built into it at the intermediate pulse ((32) or (23)). Spans are directly replicated in less than one in five motivic successions across all four sections, resulting in extremely variable pulse levels above the unit pulse.¹⁶ Third, as shown in Example 3.7, these X-material sections comprise only four distinct motives. Motives A and B are the clearly dominant forces in terms of frequency, while C and D serve more minor roles.¹⁷ Yet D rises to prominence at the very end of the scene, as discussed below, increasing its

¹⁴ A full definition of Motive-Directed Meter is provided in Chapter 1.

¹⁵ These passages were originally notated in halved durations, with a sixteenth note unit pulse. In later revisions, Stravinsky re-notated the material so as to feature an eighth note pulse; because of increased legibility, I follow the latter notational version. See Pieter C. van den Toorn, *Stravinsky and the Rite of Spring: The Beginnings of a Musical Language* (Berkeley: University of California Press, 1987), 42.

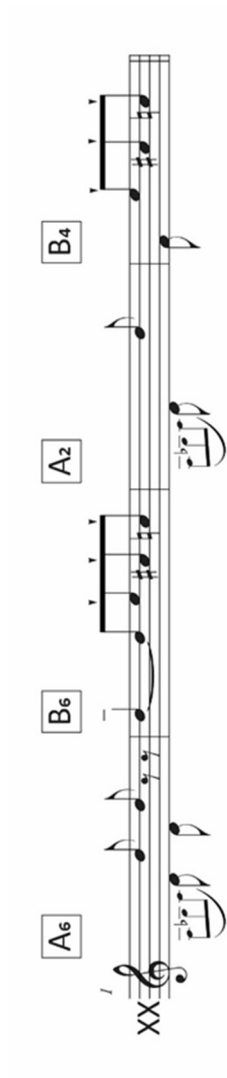
¹⁶ 19% of connections between adjacent motives feature repetition of span. This includes repetition of spans of 5, which have built-in non-repetition of duration at the irregular intermediate pulse.

¹⁷ Boulez considers my C and D to be two variants of the same motive, which he calls “C.” I struggle to find a basis for this determination of identity, other than that both C and D act as punctuating “others” to the primary dialogue between A and B. Yet this is determination of identity on the basis of function, not of aural recognizability, as in my approach.

The image displays three staves of musical notation, likely for a piano or guitar reduction of a section from Stravinsky's "Sacrificial Dance". The notation is a re-barrred reduction, meaning it has been re-arranged for clarity or performance. Above each staff, there are several chord labels in boxes, indicating the harmonic structure. The first staff starts with a tempo marking of $\text{♩} = 126$. The second staff begins with a fermata over a note. The third staff starts with a fermata over a note. The notation includes various musical symbols such as notes, rests, and accidentals, and the chord labels are as follows:

- Staff 1: A_6 , B_6 , A_6 , B_6 , A_5 , C_7 , A_5
- Staff 2: B_6 , C_5 , A_5 , B_6 , A_3 , A_5
- Staff 3: B_6 , A_2 , B_4 , A_3 , A_5 , B_4 , D_5 , D_7

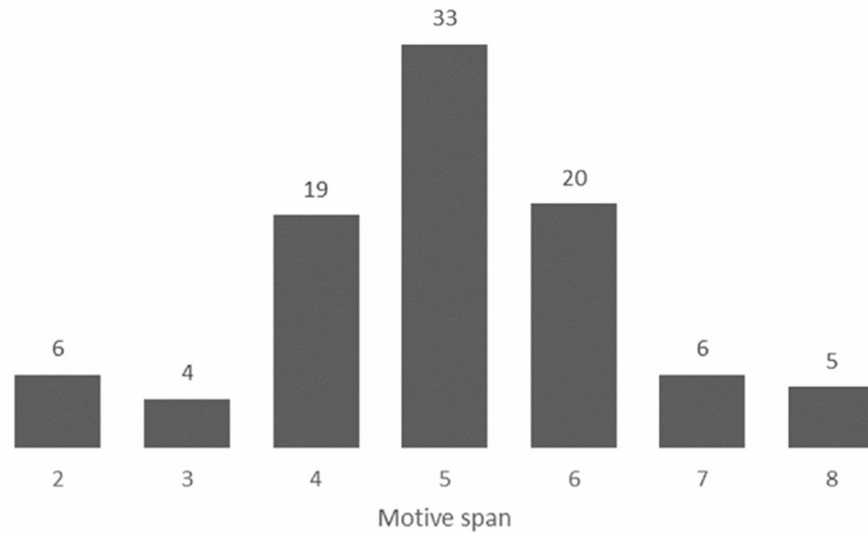
Example 3.5a. A re-barrred reduction of the "Sacrificial Dance" (Stravinsky, 2005), section X



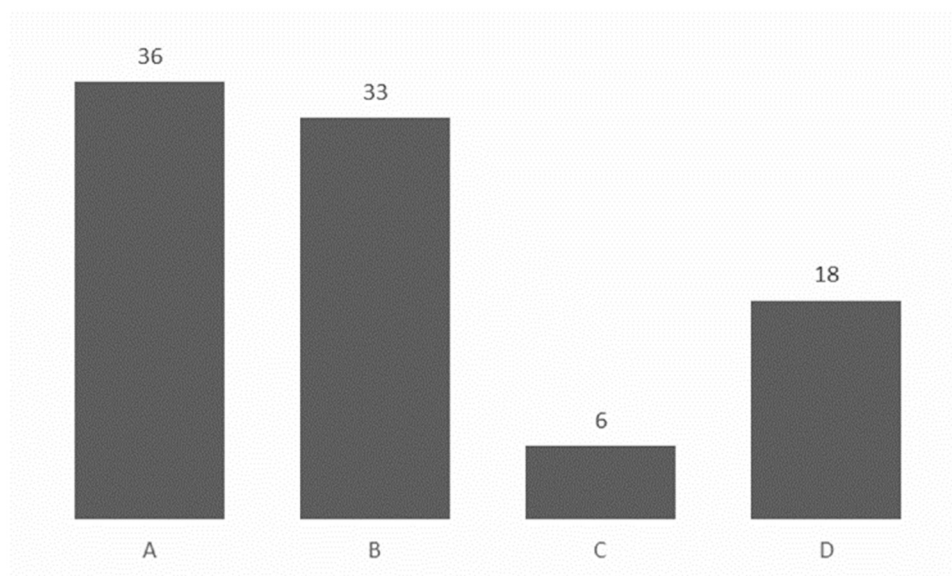
Example 3.5b. A re-barred reduction of the “Sacrificial Dance” (Stravinsky, 2005), section XX

The image displays a musical score for section XXX of the "Sacrificial Dance" by Stravinsky (2005). The score is presented as a re-barred reduction, consisting of five systems of staves. Each system begins with a treble clef and a key signature of one sharp (F#). The notation includes various rhythmic values, including eighth and sixteenth notes, and rests. Above the staves, chord labels are provided in boxes, indicating the harmonic structure. The labels include A₅, B₄, A₂, C₅, B₅, B₆, D₅, D₆, D₇, D₈, and B₈. The score is divided into measures by bar lines, and the first measure of each system is marked with a measure number (1, 12, 23, 31, 39). The notation is a reduction, meaning it simplifies the original score while preserving the essential harmonic and melodic elements.

Example 3.5c. A re-barred reduction of the "Sacrificial Dance" (Stravinsky, 2005), section XXX



Example 3.6. The distribution of all motive forms across all X-material sections of the “Sacrificial Dance”



Example 3.7. Total instances of each motive across all X-material sections of the “Sacrificial Dance”

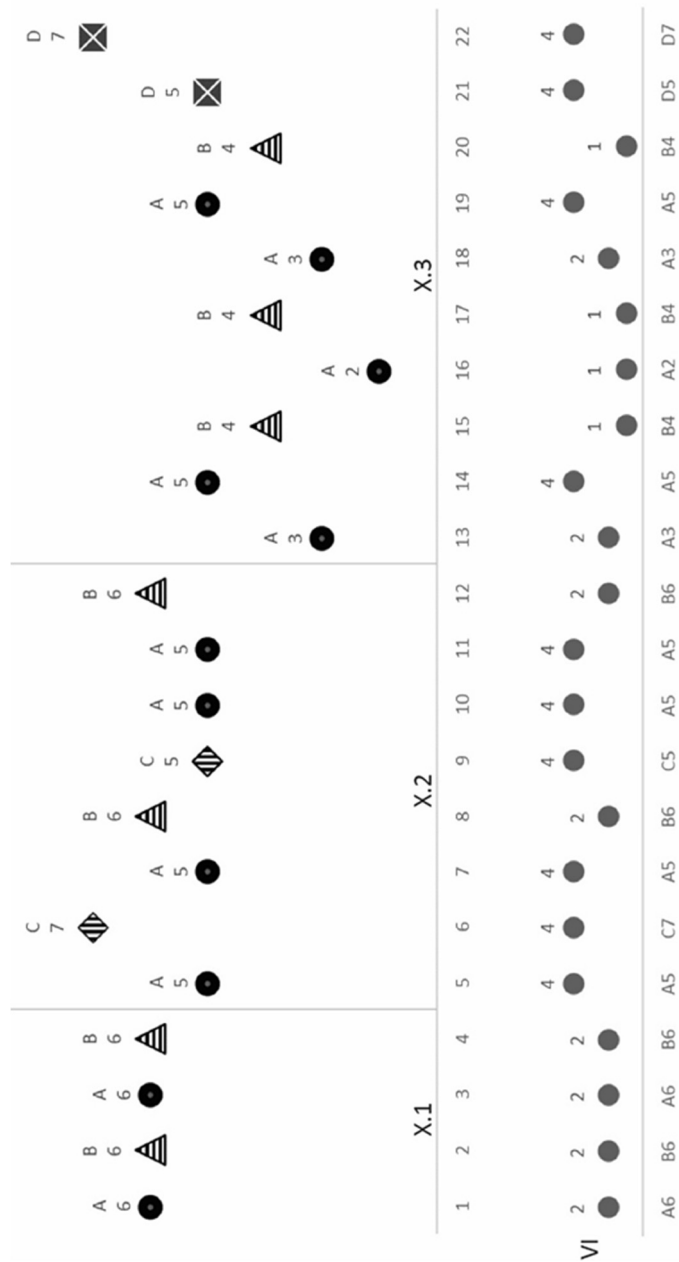
frequency substantially despite the fact that, before this final passage, D is no more common than C.¹⁸

The bulk of this material, then, consists of only two motives, A and B; as a result, familiarity and recognizability are never in doubt. Fourth and finally, the homophonic nature of the material is clear.

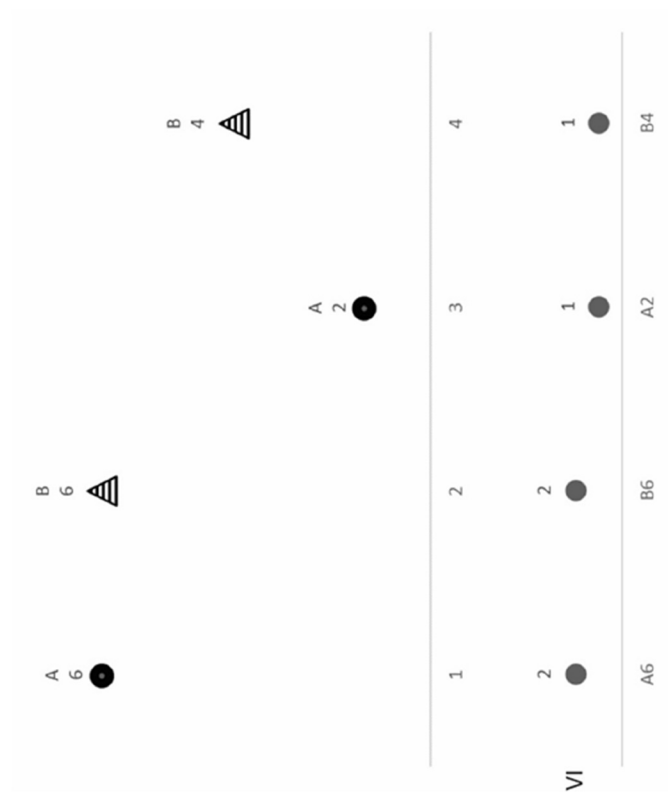
¹⁸ D appears, like C, only four time before this brief final section.

Although there are clearly two “parts”—labeled with up and down stems in Example 3.5—they fuse to form a single primary entity, the preeminence of which is never in doubt. At no point in the X passages does there exist polyphony in the standard sense of the term. These passages therefore feature consistent unit pulse, irregular slower pulses, a small number of distinct motives, and a homophonic texture, underscoring the prototypicality of this example of Motive-Directed Meter.

Examples 3.8a-c present the motive maps for sections X, XX, and XXX, respectively. These maps show the lengths and sequencing of each motive form as they appear in succession in each section, as well as the variability index values of each statement, and will serve as a useful reference throughout the following discussion. By attending to only one node shape, one may gather a sense of the shifting behavior of a given motive across a section; a sense of the inertial flow of the whole may instead be gathered by considering the changing lengths of all motives as one moves through the passage, from left to right. To supplement these maps, Examples 3.9a-c present summaries of the forms in which each motive appears across sections X, XX, and XXX, respectively; Examples 3.9d-e then break section XXX down into its two constitutive subsections, which, as we will see, exhibit starkly contrasting behaviors. Finally, Example 3.9f presents a total motive-form overview for all X-material sections. Taken together, Examples 3.8 and 3.9 make plain the clear differences between the main X and XXX sections; as a result, we will explore some essential features of each in succession before closing the analysis with a consideration of the total effect of all sections in combination.



Example 3.8a. A motive map of the “Sacrificial Dance,” section X



Example 3.8b. A motive map of the "Sacrificial Dance, section XX"

Looking over the motive map of section X shown in Example 3.8a, we see a curious narrative take shape in which the four different motives play notably distinct roles. Purely as a result of frequency, motives A and B are obviously the primary players, while C and D enter at crucial moments to contribute to and/or disrupt the dialogue between A and B. At the outset of X, in X.1, motives A and B alternate, expressing a consistent 6-unit (222) meter, of variability index (VI) 2, which enables the emergence of stable hypermetric levels.¹⁹ The “supermotives” that result from this metric and motivic consistency are discussed below. This initial state of non-MDM stability is, however, fairly short-lived; motive A loses one unit, producing an A₅ statement in m. 5 that ushers in the beginning of the Motive-Directed Meter experience. Although only losing a single eighth note, this change is striking; after a sequence of metric units connected by the Identity (I) relation, B₆ and A₅ feature no relation to help smooth the metric change. Furthermore, the actual arrival shifted by A₅ is the following downbeat, the initialization of C₇. This C statement is itself a jarring event, effecting 1) a new motive, C; 2) a new motive span, 7; and 3) a longer-length VI 4 statement than the A₅ which preceded it. Since length correlates with difficulty in higher-VI meters, as discussed in Chapter 2, this 7-unit statement is the most difficult in section X, tied with the D₇ that concludes the section. Both 7-unit forms are preceded by 5-unit statements, and are thus ushered in by way of the Ordered Subset/Superset relation (O); yet while D₇ benefits from the familiarity effected by the same-motive D₅ statement which precedes it, C₇ is granted no such amelioration.

In my reading, A₅ is the initiatory gesture, and C₇ the disruption which results from it; A₅ is a kind of “kickoff,” and C₇ the beginning of the flurry of metric activity to which it gives rise. This A₅ statement initiates the first level 2 metric displacement (2d) under a local inertia-derived set of expectations (L), a level which then persists for some time. Indeed, following the opening (222) stability of X.1, there

¹⁹ The variability index, introduced in Chapter 2, arranges categories of meters by relative difficulty of entrainability. “Pure duple” meters are level 1, other “Kirnberger” meters level 2, “Odd” meters level 3, and “irregular” meters level 4. Lower numbers are more stable and easier to entrain, in the abstract.

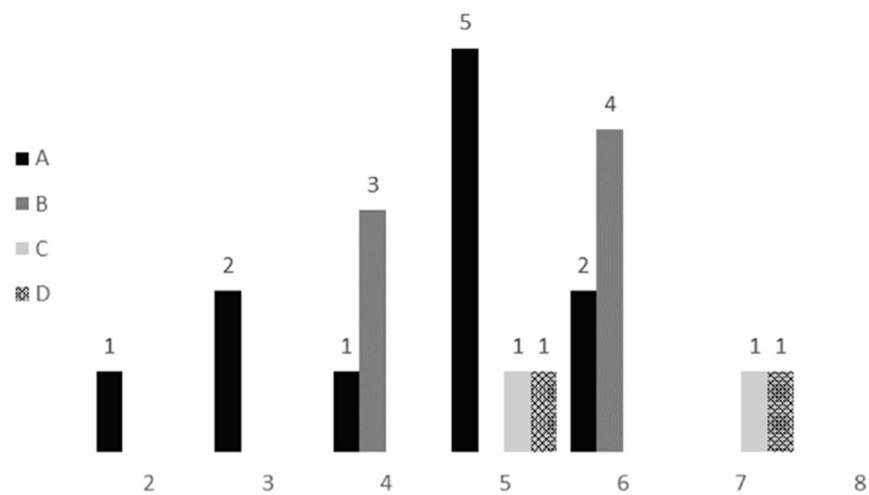
follows in X.2 a period of significant instability, in which A₅ continually asserts the 5-unit form, of VI 4, as the new normal. Motive C is successfully pulled within its orbit, appearing as C₅ in m. 9, but B maintains the relative stability of its original 6-unit (222) of VI 2. Not only are the frequent metric changes of X.2 jarring, but the introduction of motive C upends the previously regular alternation between A and B; a listener now has to predict *what* is coming next in addition to *when*. C₇ supplants B, while the C₅A₅ succession of mm. 9-10 would then seem to invert that same supplanting. B₆ remains stable to round out X.2, providing only the second non-VI 4 occurrence of the subsection. Motive A then once again acts as instigator, initiating X.3 with another bold new form, A₃, which only adds to A's increasing unpredictability. This is the first single-intermediate pulse-onset motive statement seen so far in X; all prior forms were either duple or triple. Three of the five appearances of A in X.3 are organized this way, while the other two maintain the A₅ form established in X.2.

Although motive B has been a stable predictable reference point for the listener through subsections X.1 and X.2, it is finally transformed in X.3 to an as yet unseen span to form B₄, which it will remain for the rest of X.²⁰ Not only is this length new, but so too is the VI 1 of B₄. Nor is B₄ alone in projecting VI 1; there is one sole instance of A₂ in m. 16, nestled between two instances of the new B₄ form, which produces the most stable portion of X.3, B₄A₂B₄, which features VI 1 throughout and metric displacement values of 1d between adjacent meters. Although on paper this sequence is extremely stable, it is also extremely brief; the very short 4-unit and 2-unit forms weaken the impact of the VI 1 meters such that this section does not rival the stability of subsection X.1. Following the VI 1 passage, the three-motive sequence that opened X.3—A₃A₅B₄—recurs in mm. 18-20, which, if recognized, sets up the expectation of further continuation of the VI 1 passage, namely the A₂B₄ group. This expectation is denied, and in its place, we find a brand-new motive, D, which appears twice in succession as D₅D₇. This

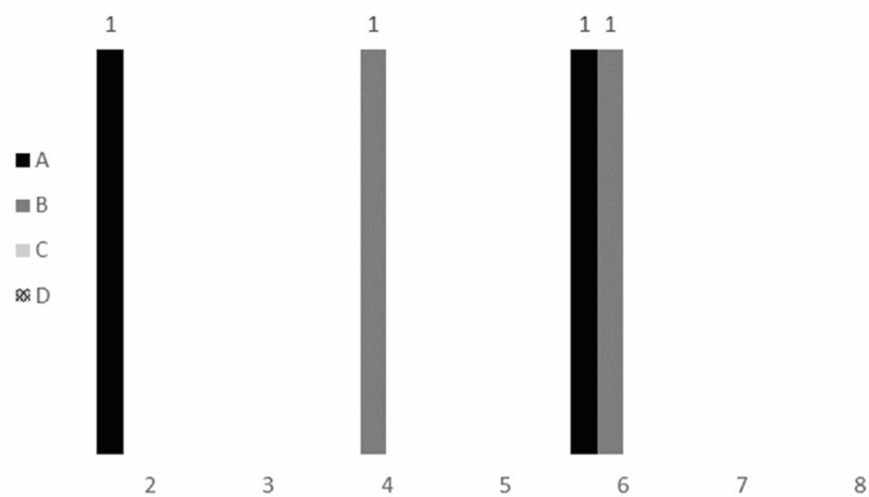
²⁰ The extreme variability of A in X.3 is such that a motivic inertia (M) approach performs extremely poorly in this subsection; B, on the other hand, is predicted extremely well under M, creating an interesting tension between the two dominant motives.

is a bold concluding gesture; just as C disrupted the flow of the beginning of X.2 and the A/B dialogue at play there, D profoundly interrupts X.3 with the newness of its motivic materials and 7-unit length of D₇, a form not seen since the C₇ of m. 6. Not only do these D motives disrupt the expectation of the repetition of the A₃A₅B₄A₂B₄ set, the newness of their content may also engage the expectation of a new potential section, X.4. This is all the more likely because of the size of X.3 prior to D—8 statements, in comparison to the 8 of X.2 and the 4 of X.1. In other words, the listener may respond to the newness of D with the expectation that, like C before it, it will bring along with it a subsection of new material. The finality of that last D₇ will therefore feel that much more abrupt when compared against this expectation of continuation.

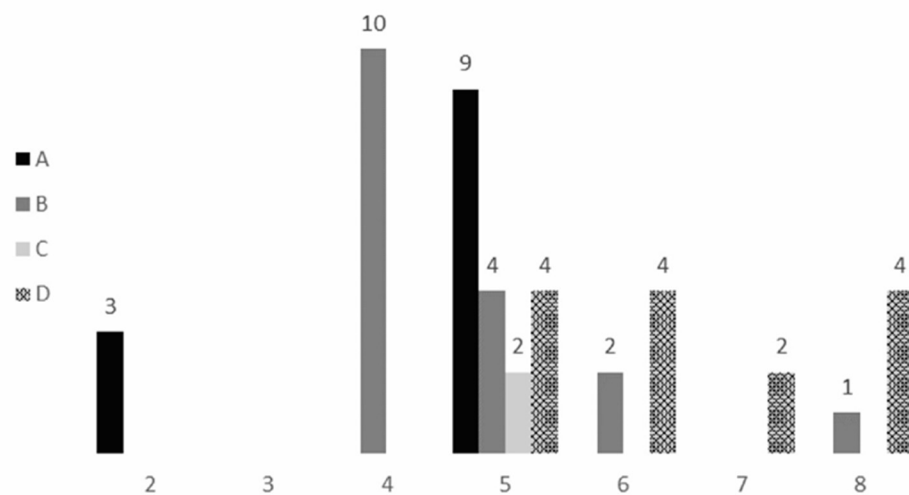
Looking over Example 3.9a, it's clear that motives C and D share much in common, both appearing once each in sizes 5 and 7. Both also prominently feature the same ascending third interval from pitches F to A, and both contrast sharply with the dialogue between motives A and B. This may be what led Boulez to consider both to be the same motive, which he simply refers to as "C." Yet not only is the actual rhythmic structure and pitch structure of C and D strongly different, as evident in the notation, but furthermore, despite appearing in the same forms, their functions in the contexts in which they appear are quite different. Motive C appears by way of interruption, doubly unexpected in that it disturbs the dialogue between A and B that spans mm. 1-5, and because, due to the shortened A₅ of m. 5, it arrives one eighth earlier than expected. Motive D enters into the conversation between A and B in light of the precedent set by C. But whereas C remains a mere interrupter in hindsight, D is much more consequential in retrospect when the section abruptly ceases, closely associating motive D with conclusion. This is an association that will be put to work in XXX, when motives C and D are further differentiated from one another.



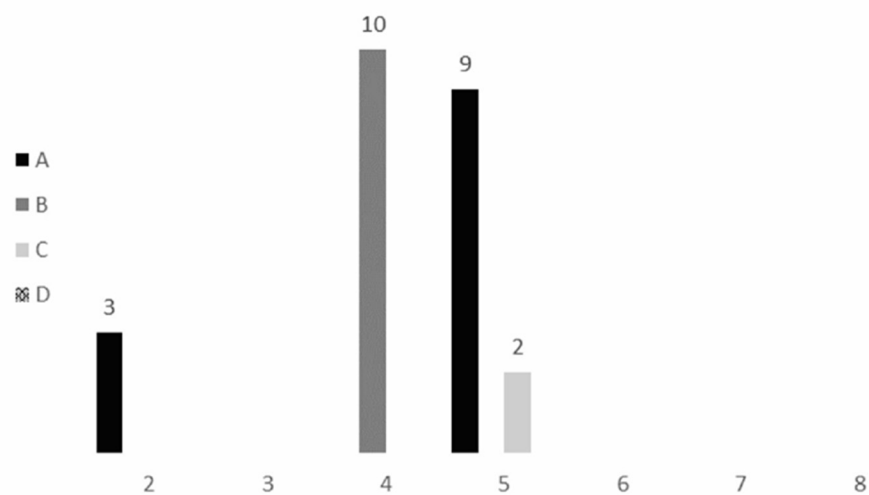
Example 3.9a. The distribution of motive forms in the “Sacrificial Dance,” section X



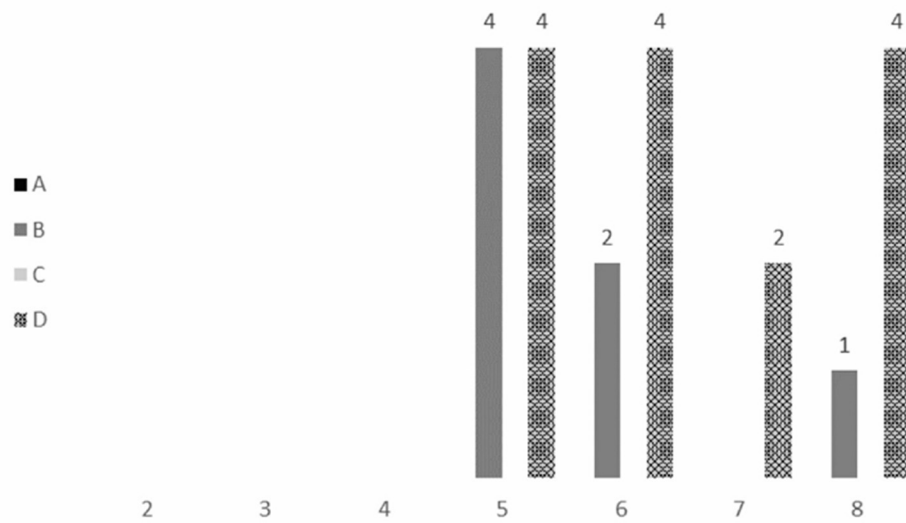
Example 3.9b. The distribution of motive forms in the “Sacrificial Dance,” section XX



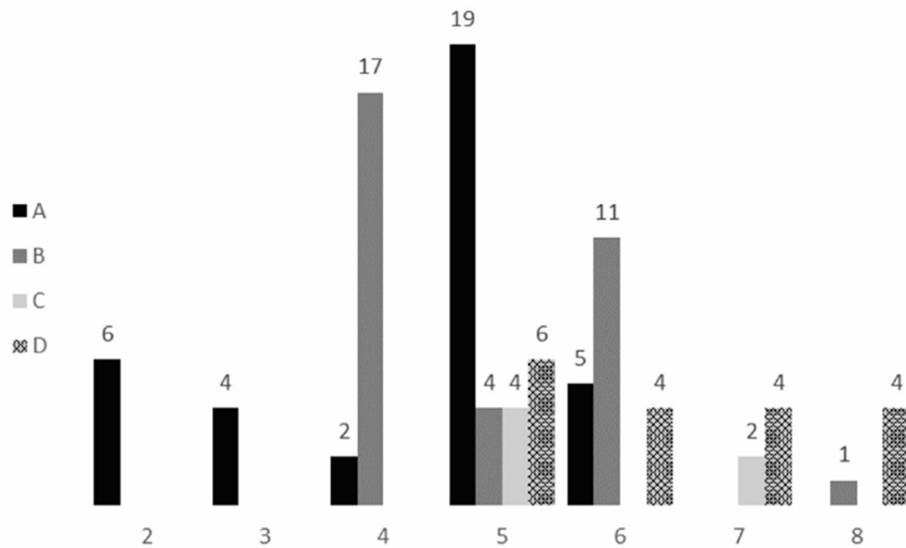
Example 3.9c. The distribution of motive forms in the “Sacrificial Dance,” section XXX



Example 3.9d. The distribution of motive forms in the “Sacrificial Dance,” subsection XXX.1



Example 3.9e. The distribution of motive forms in the “Sacrificial Dance,” subsection XXX.2



Example 3.9f. The distribution of motive forms across all X-material sections

Overall, section X features an irregular reduction in motive length, accompanied by a significant fracturing and reduction of consistency. X.1 comprises 6-unit (222) statements throughout; section X.2 still features a clear reference point, the shorter 5-unit (23) structure, but also features several deviations from this point, namely the explosive C_7 of m. 6 and the inviolate B_6 statements of mm. 8 and

12; as a result of these deviations, the average motive form length for X.2 is 5.5 units. In section X.3, on the other hand, as a result of significant variability and fracturing, it is much more difficult to determine a central reference span. Owing to the consistency with which motive B expresses it, because the twice-repeated A₅ and A₃ forms revolve around it, and because of its metric stability, I tentatively locate the 4-unit meter as the reference point of X.3. Indeed, the average length for this section is 4.2 units. This overall progression from 6 to 5 to 4 across the subsections of X affects a feeling of acceleration, which is paired with a gradual reduction of instability. Yet ameliorating this latter effect somewhat is the VI of the motive forms, described in part above. Owing to the inherent instability of irregular meters, section X.2 stands apart from its neighbors, with an average VI of 3.5, in comparison to X.1's consistent 2 and X.3's average of 2.4. Yet that final motive D flies in the face of these trends, simultaneously increasing motive length to an average of 6 and VI to the maximal value of 4. In nearly every way, then, this final D₅D₇ set presents significant challenges to the listener, concluding section X with a gesture that is as unstable as it is unpredictable.

There is yet another progression at play here in this section, one of motive arrival points relative to listener expectations along the local inertia (L), motivic inertia (M), and prototype (P) expectation sets. Both L and M feature a generally balanced mixture of late and early arrivals, though M certainly has more accurate predictions overall. Whereas a listener engaged in an L approach will experience a quick back-and-forth alternation between late and early arrivals, the experience under M is much more consistently localized into distinct sections; arrivals are all either on time or early for a large part of X, up until the beginning of X.3; at this point, there is a more balanced mixture between late and early arrival points. Then, upon arriving at a P approach—which may even be possible at the beginning of X' in a first-time hearing—arrivals are consistently either early or on time. There are no late arrivals under this approach, other than the very last D₇ statement, which has already been noted for its difficulty in several other respects. Interestingly, the shift from an M to P expectation set is accompanied by no

increase in average metric displacement values: L averages 1.43d, while M and P both feature an average of 0.94d. Yet although P does not provide additional predictive accuracy, it does facilitate a significantly different experience of X.3. Under M, X.3 is highly variable, featuring downbeat events that feel sometimes late, sometimes early. Under P, however, nearly all events are early; combined with the overall progression of length reduction from X.1 through X.2 to X.3, will heighten feelings of acceleration towards the conclusion of section X.

Uniquely amongst the sections of MDM studied thus far, motive B is transformed through alterations to its beginning, rather than its ending. In the vast majority of cases, motives are changed in MDM passages through the addition of material to the end of a motive form, or through truncations of that ending, including the removal of entire concluding submotives. The reason for this common approach is clear: ending-based changes do not impact motive recognition as significantly as changes to a motive's beginning. Recognition of motive "X" as motive "X" occurs as the motive begins, and total span expectations are already in place at that the moment of recognition. Ending-based transformations disrupt meter, but have less impact on motivic identity.

Beginning-based alterations function quite differently, as motive B makes clear. B₄ is extracted from the original longer B₆ by removal of the first submotive, that sustained pitch that interrupts the flow of the rapid low-high alternation that characterizes motive A. With only the chromatically descending second submotive remaining, recognition of B₄ as motive B now occurs simultaneously with recognition of it as that second submotive and—as soon as its span is learned—as B₄. Therefore, although unambiguously derived from motive B, and serving a similar functional role, B₄ becomes a metrically distinct entity that carries with it its own set of expectations. Since B₄ and B₆ do not intermingle in this piece, this does not require us to change our interpretive approach. However, if B₆ and B₄ were to alternate within the same space, despite their shared lineage, it would be necessary to separate them as two distinct entities for the purposes of calculating M- and P-based expectations.

Although B_4 is more metrically stable than B_6 , it is also more similar to A, since it lacks that halting first submotive described above. Therefore, although recognition of B_4 as B occurs simultaneously with recognition of it as 4-unit, this recognition occurs much later in the course of the motive's unfolding than would be the case at the identical position in B_6 , where the chromatic descent-based second submotive would be actively anticipated as a result of the unambiguous signaling of the first submotive.

Before turning to XXX, the other main section of the "Sacrificial Dance," it's worth asking what the very brief XX does to bridge the gap between X (and X') and the extended presentation of this material in the final X-based section. Comprising only four statements in the sequence $A_6B_6A_2B_4$, the section clearly draws simultaneously from X.1 and X.3. A_6B_6 is an exact replication of the opening of X, giving a first-time listener the clear expectation for a full presentation of the X material. Yet unlike that first section, the stable set is not repeated; instead, we are met with A_2B_4 , a set drawn from that relatively stable VI 1 passage of X.3. In several crucial respects, XX summarizes with impressive concision the overall processes at work in X, as described above, including dialogue between motives A and B, general reduction of metric length, reduction of motive form consistency, and slight increase in VI values (without the central spike seen in X.2). XX may be a kind of "fake-out" that, like the D_5D_7 set at the end of X, sets the listener up with the expectation for significant continuation that does not follow. But more than this, XX is an encapsulation of the metric and motivic work of X, which summarizes what has been done with the material so far in preparation for entirely different treatment in XXX. We turn now to that substantial final section, which serves as a significant exclamation mark at the end of the *Rite*.

Section XXX comprises two starkly contrasting subsections, XXX.1 and XXX.2. As Examples 3.9d and 3.9e make clear, the subsections are starkly differentiated by motivic content. The subsections of section X flowed into one another rather smoothly and featured significant overlap; motives A and B were shared between all three subsections, and even the specific motive form B_6 united X.1 and X.2, while A_5 united X.2 and X.3. The contrast between XXX.1 and XXX.2 is much starker. Motives A and C are

featured in XXX.1 only, while D only appears in XXX.2. B is the only motive that appears in both, though even here there is a sharp distinction, namely that no forms are shared across subsections—B appears as only B₄ in XXX.1, and as B₅, B₆, and B₈ in XXX.2. Furthermore, the pitch content of motive B is quite different between XXX.1 and XXX.2. Distinctions between these subsections runs much more deeply than the presence or absence of certain motives: spans are also quite distinct, as only one duration—the 5-unit—is shared across subsections, all other spans being exclusive to the one or the other. Additionally, motive form consistency is quite divergent, as was noted relative to the subsections of X. XXX.1 is extremely consistent, as only motive A expresses different forms: 9 instances of A₅ and 3 of A₂, therefore maintaining an unambiguous prototype form. A is clearly the most difficult motive in the subsection, due to the 5-unit prototype and variable forms; B and C each exist in one form only. Compare this with XXX.2, in which B exists in three forms, with a slight preference for B₅, while D exists in four forms without any clear prototype form. As a result, even though there are fewer motives to keep track of in XXX.2, the variability of the forms will make it much more difficult for M or P approaches to grasp.

The range of VI values also distinguishes the subsections of XXX. XXX.1 features a mostly regular alternation between VIs 1 (B₄ and A₂) and 4 (A₅ and C₅). There are no intermediate values, and although there are some points of disruption of the regular patterning, these center around certain motive groupings: one instance of VI 4 is cancelled out in each iteration of the B₄A₂B₄ set (mm. 2-4, 8-10, and 22-24), and the intrusion of C₅ accompanies a slightly extended series of VI 4 values in the C₅A₅C₅A₅ sequence of mm. 14-17. VI 1 then becomes entirely replaced in the first half of XXX.2, which instead features alternation between VI 2 and VI 4, a net decrease in metric prototypicality. One outlier—the VI 1 B₈ of m. 32—foreshadows the concluding motive D-based portion of XXX.2, which features extremely stable meters relative to the rest of XXX. The D₈ of m. 38 then directly precipitates the stable concluding section D₈D₆D₈D₆D₈D₇. With the exception of the final VI 4 D₇, this relatively stable concluding section

features alternation between VI 1 and VI 2, representing the most prototypical set of meters in all X-material sections.

Finally, the two large subsections of XXX are distinguished by the types of relations that hold between adjacent meters. Metric relations did not play a role in our overview of section X—that section features a fairly even distribution of relations such that none play a particularly significant role. In XXX, the relations are striking: XXX.1 is dominated by the beat relation (B), one of the closer connections that maintains the number of intermediate pulse articulations in each bar. The makeup of XXX.2 is entirely different: the majority of connections feature no relation at all, with only minimal representation of a scattering of several different relations. Interestingly, the one notable feature that XXX.1 and XXX.2 share in common is the function of the Unordered subset/superset (U) relation: all six instances in XXX.1 and all four in XXX.2 appear in pairs as (U subset, U superset). In other words, a smaller span emerges as the result of the removal of a pulse from its larger predecessor (U subset), and is then expanded once again to that same—or a new—larger span (U superset). This occurs, for example, in the $B_4A_2B_4$ sequence in mm. 2-4, 8-10, and 22-24 of XXX.1 and the $D_8D_6D_8$ of XXX.2, mm. 40-42 and 42-44.²¹ Yet despite this notable relation commonality, the subsections of XXX are starkly contrasted in their relational configurations. As a result of the significant lack of relational connections, XXX.2 is much more difficult than XXX.1, particularly under an inertial scheme. But more than this, the connective character of the subsections is affectively distinct. Whereas, as the frequent B relations underscore, XXX.1 comprises almost entirely meters with two intermediate articulations (11 instances of (23), 10 of (22)), the only exceptions being the three A_2 statements, subsection XXX.2 features a fairly even spread of two-intermediate (8 of (23)), three-intermediate (6 of (222), 2 of (223)), and four-intermediate (5 of (2222)) meters. Compounding this difficulty are the frequent shifts between these categories; only three

²¹ This particular configuration of U relations also occurs in section X, mm. 15-17, as $B_4A_2B_4$, and in XX as $B_6A_2B_4$. The U relation never appears unpaired across all X sections, nor even in the reversed (U superset, U subset) ordering.

of the 20 connections between adjacent meters in XXX.2 do not feature a category shift (mm. 1-2, D₅B₅; mm. 4-5, B₅B₅; mm. 12-13, D₆D₇). Indeed, these are the only instances of Identity (I) and Beat cardinality (B) relations, respectively, in XXX.2.

In nearly every respect considered thus far, XXX.2 is significantly more perceptually difficult than XXX.1. The first subsection does feature more motives than the second, yet, as C only appears twice in XXX.1, this difference is negligible. In terms of motive form consistency, VI values, and metric relations, XXX.2 is accompanied by a significant jump in perceptual complexity, with the exception, in some respects, of the concluding D-based section, to which I return below. At a zoomed-out level, then, XXX presents an extended presentation of X-based material beyond the scope of the first-time listeners' experience or expectation, the metric structure of which becomes increasingly difficult to predict and successfully entrain as the passage progresses, until the final D section. Although not directly related to difficulty as such, and despite the significant differences between X and XXX already noted, it may come as a surprise that the three expectation-generation methods perform similarly here as in X in terms of the distribution of early and late arrival points. Both L and M feature irregular back-and-forth motion between late and early, with a fairly even mixture of each; and, as in X, M does feature significantly more accurate predictions than does L. Unlike in X, where P- and M-based expectations produced identical average displacement of 0.94d, P-based expectations provide a significant advantage in XXX, with an average of 0.77d relative to M's 1d. P provides a predictive advantage here, and furthermore, the experiential qualities under a P-based approach are extremely different than in X. As noted above, nearly all inaccurate predictions in X are early. In XXX, the structure of motives relative to P-based expectations is flipped; over two-thirds (71%) of inaccurate predictions are late. Uniquely, then, a listener will experience a similarly even mixture of lateness and earliness as they become familiarized with the materials of X and XXX. As the structure becomes better learned and prototype motive forms come into view, the sections then become highly differentiated. Because of the repetition of X as X', the

listener may engage P-based expectations in this section and become used to the mixture of accurate and early arrivals; the expectation of the continuation of that mixture is then thwarted in XXX, as the mixture of accurate and *late* arrivals offers a markedly different affective metric experience.

Zooming in to a more local level and considering other connections between the expectations set up by X and this new XXX section, it's worth noting how motives C and D, which played relatively minor (though important) roles in X—and were absent from the brief XX—fulfill new functions in XXX. In X, C was an interrupting presence, disrupting the dialogue between A and B with maximal-VI statements C₇ and C₅. Here in XXX, the motive is more naturalized. Situated squarely in the middle of XXX.1, the C₇ form has been stricken, ensuring that, as noted above, no triple tactus meters are found in this first subsection. Rather, C exists only as C₅, expressing exactly the same metric structure as the A motives that surround its two appearances, greatly weakening the disorienting power it possessed in X.²² Motive C now serves a stabilizing role, producing the most stable passage in all of XXX.1, in which only two meters—(23) and (22)—can be found. M-based expectations perform flawlessly here, as each motive appears in one form only. Only after the memory of C's intrusion has faded does A₂ reappear in m. 23, precipitating the emergence of D and the onset of XXX.2.

What of this final D-centric subsection? Although it emerges smoothly from the materials which precede it, and although consisting of only the B and the D motives now familiar from the endings of X and X', it nonetheless stands out as notably distinct from all other X-based material. This is most obviously the result of the substantial presence of motive D, which has before, like C, only appeared in limited contexts. While C was transformed in some small ways from X to XXX.1, D takes on a radically new role here in XXX.2, while nevertheless maintaining and drastically expanding its fundamental function as purveyor of formal closure—or, at the very least, of cessation. Whereas the short set D₅D₇

²² Although the first C₅ is directly preceded by B₄, this form is itself preceded by two adjacent statements of A₅.

was sufficient to end X—and whereas the brevity of XX was such that it needed no explicit act of closure—XXX, as the ending of the ballet itself, requires much more of motive D.

Motive D appears first in the set $D_5B_5D_6$, which is somewhat reminiscent of the $B_4D_5D_7$ conclusion of X. Although there is initially no indication to a first-time listener that motive A will never return—this realization will only occur gradually, through awareness of its absence—the new variability of motive B will be unmistakable. Up to this point, B has been a stabilizing force, existing only as B_6 in X.1 and X.2, B_4 in X.3, and an invariant B_4 throughout all of XXX.1. Two forms may exist in X, but they never intermix. Rather, there is a sharp cutoff wherein B_6 is transformed into B_4 ; the repetition of X as X' may effect that transformation as temporary, but XXX picks up where X left off. Throughout XXX.1, B, in the form of the B_4 of VI 1, is the invariant bearer of stability, and the listener will doubtless come to rely on it as such. The shift to B_5 is new, but potentially still admissible within the conception of B developed so far through the course of the experience of X and XX. The durational intermixing of B as $B_5B_5B_6B_5B_8$ across mm. 28-32 is, however, fundamentally new in its design, and is simultaneously metrically difficult and radically uncharacteristic behavior for B. D_6 and B_6 of mm. 27 and 30, respectively, also introduce triple-tactus meters into XXX, presenting new entrainment challenges, both of which are arrived at without the ameliorating effects of metric relations of any sort. Compounding this experiential difficulty is the awareness of the absence of A which is likely to creep in at this time; until the beginning of XXX.2, A has not been absent for more than two successive motive statements (B_4C_5 , mm. 13-14), and this occurred only once. While the appearance of D at the beginning of XXX.2 may have signaled closure, this new behavior exhibited by B in A's absence introduces significant unpredictability and urges a reevaluation of metric and motivic expectations.

The appearance of D accompanies the destabilization of B, but this newfound freedom for the long-stable motive is short-lived. After the brief B-based section described above, D returns as D_5 and, after one final statement of B's original B_6 version, asserts uncontested motivic saturation, enacting one

of the most curious metric sequences in all of the “Sacrificial Dance.” Across mm. 35-38 D increases incrementally, creating the stepwise progression $D_5D_6D_7D_8$. This process cannot be properly anticipated under any of the semi-automatic expectation-generation methods; all arrivals, in fact, feature a maximal lateness displacement value of 3. Completely unlike anything that has come before, there is no way for a listener to correctly anticipate this sequence; at best, perhaps the sequential progression might be noted midway and its ending D_8 correctly anticipated; if this were the case, however, it would inevitably result in the expectation of D_9 at m. 39, where instead the length of the motive is abruptly reduced back down to the D_5 form that preceded this uncharacteristic progression. Metrically, the D-initiated, but B-centric XXX.2.1 is notably distinct from the fully D-comprised XXX.2.2. Although both consist largely of the same metric spans—(223) being notably absent from XXX.2.1—their prioritization and sequencing produces radically different experiential results. D_8 , as the aspirational goal of the stepwise ascent, becomes the central orienting point for XXX.2.2. And, although D_5 and D_7 still exist in this final space, the period of alternation between B_8 and B_6 produces a period of significant relative metric stability, with VI values of only 1 and 2 and a consistent quarter-note pulse throughout mm. 40-44. This pulse is more than merely an inference on the part of the listener; this is the very moment at which the low instruments—most prominently the timpani—begin to articulate a recurrent quarter-note pulse, which persists until the end of the section. In fact, in the alternation between pitches A and C, this part also articulates a half note rhythm. The quarter note is compatible with a parallelistic hearing, but because of the D_6 forms, the half-note pulse is not. It is possible that the listener might be swayed into an inertial approach by this part, though I find the force of the onset events that articulate the quarter note vastly more significant than the pitch content that underpins the half. As a result of this quarter-note pulse, metric stability is not only potential in this final passage, it is palpable, all but forced upon the listener.

The different expectation tracks mark decidedly different experiences of XXX.2. L performs very poorly for most of the subsection, but then, as a result of the presence of the low-VI D_6 and D_8 , features

much less jarring 1d values for XXX.2.2. M produces quite accurate metric expectations for the second half of XXX.1, when forms are fairly consistent, but the erratic behavior of B in XXX.2.1 and of D in XXX.2.2 throw the approach into disarray; nearly all of XXX.2 is incorrectly anticipated under M. P, as usual, does produce extremely accurate expectations for XXX.1; in fact, a listener guided by P-based predictions correctly anticipates every single arrival for the second half of XXX.1 up to the final A statement. Like the other methods, however, P is similarly confused by XXX.2, effecting a metric experience in which nearly every arrival is incorrect—and every incorrect arrival is late—up until the final D₇ motive statement. In nearly every measurable way, then, XXX.2.1 contrasts sharply with XXX.1, and XXX.2.2 then contrasts more sharply still with XXX.2.1. The net effect is one of an acceleration of changes and a general confounding of motivic and metric expectations alike. But how does one signal an ending to material of such unpredictability? As noted above, X closed with mere cessation. XXX takes a quite different approach; the listener, now fully expecting the continuation of extreme metric unpredictability, is suddenly confronted by metric *stability* in XXX.2.2; Stravinsky has effectively reversed expectations, creating a sense of instability out of predictability, as motive D finally makes good on its promise to effect meaningful, convincing, and lasting closure.

Before moving on from the “Sacrificial Dance,” it’s worth considering what this prototypical example of Motive-Directed Meter can tell us about pulses slower than those on which we’ve been focusing. The question is directly analogous to those explored so far, but pertains to a broader temporal scope. Rather than considering our metric expectations of the motive currently unfolding, we consider instead what the current motive can tell us about what motive(s) will follow and the metric organization of those future events. Consider that, out of 11 appearances of A in section X, 7 are directly followed by B. Crucially, this association develops from the very beginning, when X begins with ABAB. Furthermore, XX is composed entirely of ABAB, and XXX begins ABABABABAB—10 out of 12 appearances of A in XXX are followed by B. It’s reasonable to assume that A instills in the listener not only expectations about its

own metric length, but that motive B is upcoming. It's difficult to know, however, the extent to which explicitly *metric* information is carried along with this expectation; after all, the temporal scope with which one is able to make non-inertial metric predictions cannot be infinitely large, particularly when the mechanisms of entrainment are intensely occupied coping with unexpected metric events in the present.

Consider Example 3.10, which presents one potential set of “supermotive” expectations. This reading makes clear that the issues facing a listener at this level are directly homologous to those at the level of meter proper. Specifically, Example 3.10 threads a middleground approach between an inertial set of expectations, which would in this case comprise duple parings of motive statements throughout, and a parallelistic one, which would recognize the roles of different motives—such as the initiatory power of A and the responsorial function of B—and formulate supermotive expectations accordingly. I believe the interpretation given in Example 3.10 balances these forces well, providing a listening experience which does allow for deviations from supermotive periodicity without featuring drastic shifts of supermotive size. XX, a duple set of duple sets, is extremely simple. X and XXX pose somewhat greater challenges.

Set	Motive Statements		
1	A6	B6	
	A6	B6	
2	A5	C7	
	A5	B6	C5
3	A5	A5	B6
	A3	A5	B4
4	A2	B4	
	A3	A5	B4
(5)	D5	D7	

Example 3.10a. The supermotive structure of the “Sacrificial Dance,” section X

Set	Motive Statements	
1	A6	B6
	A2	B4

Example 3.10b. The supermotivic structure of the “Sacrificial Dance,” section XX

Set	Motive Statements			
1	A5	B4		
	A2	B4		
2	A5	B4		
	A5	B4		
	A2	B4		
3	A5	A5	B4	C5
	A5	C5		
4	A5	B4		
	A5	B4		
	A5	B4		
	A2	B4		
5	D5	B5		
	D6	B5		
6	B5	B6		
	B5	B8		
7	D5	B6		
	D5	D6		
8	D7	D8		
	D5	D8		
	D6	D8		
	D6	D8		
(9)	D7			

Example 3.10c. The supermotivic structure of the “Sacrificial Dance,” section XXX

The (AB, AB) opening of X sets up the duple inertial expectations and, as noted above, functional expectations for A and B. In the next set (AC, ABC) C replaces B, but the hypermotivic flow is

unperturbed until the final C_5 . Here two forces conspire to disrupt the previously duple structure: C reprises its concluding function, and A—which has as yet never performed any role except that of initializer—returns to reassert that role at the beginning of the third set. The parallelisms in set 3 underscore this new triple subset and reinscribes it as (AAB, AAB), creating a new sense of normalcy. This newfound stability is then disrupted once again in set 4, (AB, AAB), which combines the two non-C subsets, creating instability that paves the way for the incomplete final set 5, (DD). Note that every set in X—with the exception of (DD), which is prematurely truncated—is duple at the level of the set, though the subsets feature significant alternation between duple and triple groupings. XXX will increase in supermotivic instability by disrupting the duple nature of the set itself.

XXX begins smoothly enough, with an (AB, AB) set 1 reiterating the same general structure that opened X and XX. Whereas set 2 quickly presented a triple subset in X, the A_2 of XXX lacks the initiatory power necessary to begin a new set, and so becomes subsumed within set 2 (AB, AB, AB), which is furthermore united by the consistent B_4 groups that conclude each subset. Set 3 features radical changes: since AAB has been a consistent triple group, and B has not been able to initiate subsets, AAB is first experienced; C then repeats its role as agent of closure, producing the first four-statement subset. Set 3 is thus (AABC, AC). Set 4 recovers from this aberration, asserting a new duple normal at the subset level while deflecting quadruple to the level of the set: as A_2 could not initiate a subset at the end of set 2, neither can it do so here. Set 4 is thus (AB, AB, AB, AB). D then replaces A at the outset of XXX.2, producing the otherwise normal set 5 (DB, DB). Set 6 underscores the unusual behavior exhibited by B here in XXX.2.1, as described earlier: it initiates both sets and subsets for the first time, producing (BB, BB). In set 7, D quickly regains control as (DB, DD), in which subset 1 reasserts the primary of D over B and subset 2 obliterates the latter motive altogether. Finally, in set 8, quadruple structure returns with the unimotivic (DD, DD, DD, DD). This is largely a parallelistic reading of the final set, however, and it's possible that the inertia of the duple sets 5-7 will cause the listener to make a similar division here,

splitting my set 8 into sets 8 and 9, each (DD, DD). Finally, as at the end of X, the final D₇ represents an incompleteness—now, as a single motive statement, even less complete than the D₅D₇ subset that concluded that earlier section. While the majority of this “Sacrificial Dance” analysis has focused on the entrainment difficulties around the level of the felt tactus, it’s quite clear that higher-level supermotivic organization presents its own predictive challenges.

II. THE *RITE OF SPRING*: “GLORIFICATION OF THE CHOSEN ONE”

The main A motive of the “Glorification of the Chosen One” resembles that of the “Sacrificial Dance,” as well as material from the “Dance of the Earth” scene (not analyzed here); Daniel Chua calls this “motif (x)” and outlines its various manifestations in a depiction reproduced as Example 3.11.²³ Despite such surface commonalities, the metric and motivic structure of the “Glorification” is strikingly different from that of the “Sacrificial Dance,” as my analysis will demonstrate. Whereas the latter scene presented Motive-Directed Meter at its most normative, the “Glorification” presents numerous problems for the methods used above, primarily because of the significant number of similar motives at play in this scene. Despite these problems, the “Glorification” presents the second most normative example of MDM in the *Rite*, and—unlike the “Sacrificial Dance”—it facilitates an MDM experience throughout, without intervening sections of metrically normative materials.²⁴ It may be no coincidence that these two scenes are those concerned most closely with the sacrificial victim; the frenetic energy of the “Glorification” accompanies their selection, and the “Sacrificial Dance” their ritualistic undoing.²⁵

²³ Daniel K. L. Chua, “Rioting with Stravinsky: A Particular Analysis of the ‘Rite of Spring,’” *Music Analysis* 26, no. 1/2 (2007): 80-81.

²⁴ Review Example 3.4 to see how the analyzed X-material sections of the “Sacrificial Dance” alternated with more metrically normative sections.

²⁵ For more on gender relations in these two particular scenes, see Kielian-Gilbert, “Dissonant Bells: *The Rite*’s ‘Sacrificial Dance’ 1913/2013.”

'Dance of the Earth'

72 + 3 motif (x)

'Glorification of the Chosen One'

104 motif (x)

'Sacrificial Dance'

142 motif (x)

Example 3.11. Tracing “motif (x)” across the Rite (Example 17; Chua, 2007)

Although the “Glorification” has been much discussed, detailed rhythmic or metric analyses of the scene have been scant. That which does exist emerges from two of the main figures discussed above, Pierre Boulez and Pieter van den Toorn, and their analyses of this scene feature the same general methodological approaches as do their treatments of the “Sacrificial Dance.” As a result, their respective analyses of the “Glorification” will be dealt with more briefly here. As before, Boulez discusses the formal structure of the work, again employing traditional formal labels to define the scene as

exemplifying ternary form, albeit nonstandard.²⁶ His descriptions of the interplay between forces is poetic and suggestive: “The second section,” he writes, “is based upon the vertical and antagonistic partitioning of two divisions (sound and rhythm), with each of them preponderating over the other during the section.”²⁷ Yet for all of his descriptive language, his final conclusion is that the form of the scene is “Constituted at least as much by rhythmic structural characteristics of very great complexity as by harmonic relations of great simplicity.”²⁸ In other words, Stravinsky has transplanted the complexity Boulez believes to be necessary in great works of art from the harmonic domain—or from a shared harmonic and rhythmic domain—to the purely rhythmic. All told, his analysis provides little insight into the experiential realm of this scene.

Consistent with his general approach, van den Toorn examines the opening of the “Glorification” in order to make a case for an inertial hearing compatible with his notion of background periodicity. And yet, writing in 2013, his position seems to have nuanced somewhat. He presents both what I would label parallelistic and inertial hearings of the opening measures, reproduced here as Example 3.12.²⁹ Rather than making an explicit case for background periodicity over and above an MDM experience, van den Toorn notes the inherent tension between the two listening strategies, recognizing that both are in play simultaneously, perhaps intentionally so.³⁰ Yet the most relevant component of his analysis is his set of observations about motivic derivation which, as we will see, is a fundamentally thorny issue in this scene. He notes that “Much of the rhythmic play of this movement may be traced to

²⁶ Boulez, *Notes of an Apprenticeship*, 106.

²⁷ *Ibid.*

²⁸ *Ibid.*, 113.

²⁹ Pieter C. van den Toorn, “From the Firebird to the Rite of Spring: Meter and Alignment in Stravinsky’s Russian-Period Works,” *AVANT IV*, no. 3 (2013): 60.

³⁰ *Ibid.*, 61.

changes that occur in the number of successive repetitions of motive a2,” the small “boom-chuck” figure that begins the primary A motive; “Left uncertain of that number, listeners are left guessing, as it were, with their anticipation of a return to the more reliable block A5...”³¹ Indeed, this small figure is at the core of several musical structures throughout this scene; the extent to which the listener grants these structures individual identities has significant consequences for the emergence of metric expectations.

a)

104 ♩ = 144

b)

104 ♩ = 144

Example 3.12. Van den Toorn’s two barrings of the opening of the “Glorification of the Chosen One” from the *Rite of Spring* by Igor Stravinsky (Example 5; van den Toorn, 2013)

Although Chua identified the recurrent appearances of what he calls “motif (x)” across multiple scenes, he problematizes the identity of this structure as a motive proper. “These recurrences,” he writes, “cannot close the *Rite* as a thematic construct; they are open associations—elective affinities rather than motivic identities. And in this sense, Stravinsky was right: ‘accents were really the

³¹ Ibid., 59.

foundation of the whole thing’.”³² I follow Chua in questioning the extent to which his “motif (x)” can function in the same way as motives in the sense that I use the term here. Although they may reference one another across multiple scenes, for example, it seems extremely unlikely that metric expectations formed in one scene—here in the “Glorification,” for example—would be sustained and transplanted into later scenes such as the “Sacrificial Dance.” Chua seems to treat this quasi-motive as purely rhythmic in nature, but this misses the point; a number of musical features, in addition to the strictly rhythmic, combine to distinguish separate instances of his “motif (x),” namely register, dynamics, and, crucially, timbre and instrumentation. It is these factors to which a listener will attend when attempting to sort out identity, which, as we will see, is a fundamental point of contention here in this scene.

Unlike the “Sacrificial Dance,” the “Glorification” affords Motive-Directed Meter throughout, with the exception of a brief gap two-thirds of the way through, when a sudden *Molto allargando* one bar before rehearsal 117 disrupts the otherwise unbroken unit pulse stream. The re-barred and reduced score is given as Example 3.13, which features a particular set of motive labels to be described below. Given the consistent, non-sectional nature of this MDM, the entire scene may be represented in a single motive map, as given in Example 3.14, which, for the time being, does not feature motivic determination. Instead, the binary coloration symbolizes only potential inclusion within Chua’s motif (x): solid black dots are likely candidates, while white unfilled dots cannot be considered representatives.³³ As this map makes plain, the vast majority of motive statements (39 of 49) are instances of motif (x), and therefore potentially identifiable as members of the same motive. In addition to the obvious difficulty of the frequent and jarring metric shifts themselves, this potential identity is the primary perceptual problem that the “Glorification” presents. The “Sacrificial Dance” featured relatively clear distinctions

³² Chua, “Rioting with Stravinsky: A Particular Analysis of the ‘Rite of Spring,’” 80.

³³ Note that this does not mean that all white unfilled dots are representatives of the same motive, only that they are not motif (x).

The image displays a musical score for a re-barred reduction of the "Glorification of the Chosen One" by Stravinsky (2005). The score is presented on four staves, each with a key signature of three flats (B-flat, E-flat, A-flat). The notation includes various rhythmic values, accidentals, and dynamic markings. The staves are labeled with boxed text: Staff 1 (left to right) has E9, E11, E15, and F10; Staff 2 has E'18, G4, F10, and F12; Staff 3 has F10, F12, F10, and F10; Staff 4 has G'6, F12, G'4, F6, and G'6. The music features complex rhythmic patterns, including triplets and sixteenth notes, and is marked with accents and slurs.

Example 3.13. A re-barred reduction of the "Glorification of the Chosen One" (Stravinsky, 2005)
(continued)

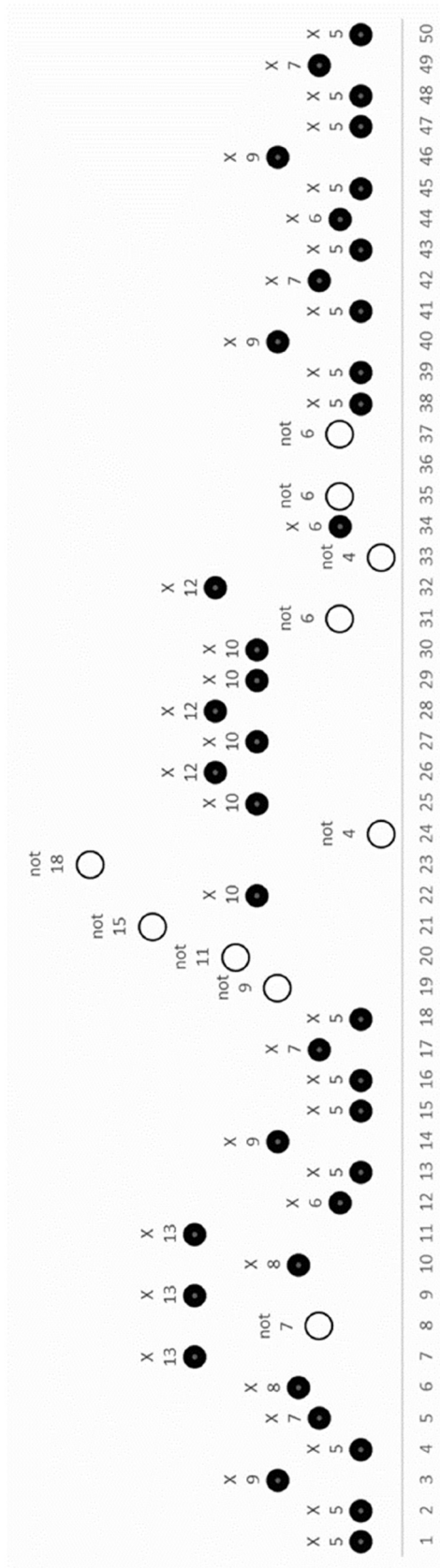
The image displays three systems of musical notation, likely for a piano or guitar reduction of a vocal or instrumental piece. Each system consists of a single staff with a treble clef and a key signature of one sharp (F#). The notation includes various chords, melodic lines, and rhythmic markings.

System 1: The first measure is marked with a box containing B_6 . The second measure is marked with a box containing A_5 . The third measure is marked with a box containing A'_9 . The notation includes a sixteenth-note triplet, a sixteenth-note triplet, and a sixteenth-note triplet.

System 2: The first measure is marked with a box containing A_5 . The second measure is marked with a box containing A_7 . The third measure is marked with a box containing A_5 . The fourth measure is marked with a box containing D_6 . The fifth measure is marked with a box containing A_5 . The notation includes a sixteenth-note triplet, a sixteenth-note triplet, and a sixteenth-note triplet.

System 3: The first measure is marked with a box containing D_9 . The second measure is marked with a box containing A_5 . The third measure is marked with a box containing A_5 . The fourth measure is marked with a box containing A_7 . The fifth measure is marked with a box containing A_5 . The notation includes a sixteenth-note triplet, a sixteenth-note triplet, and a sixteenth-note triplet.

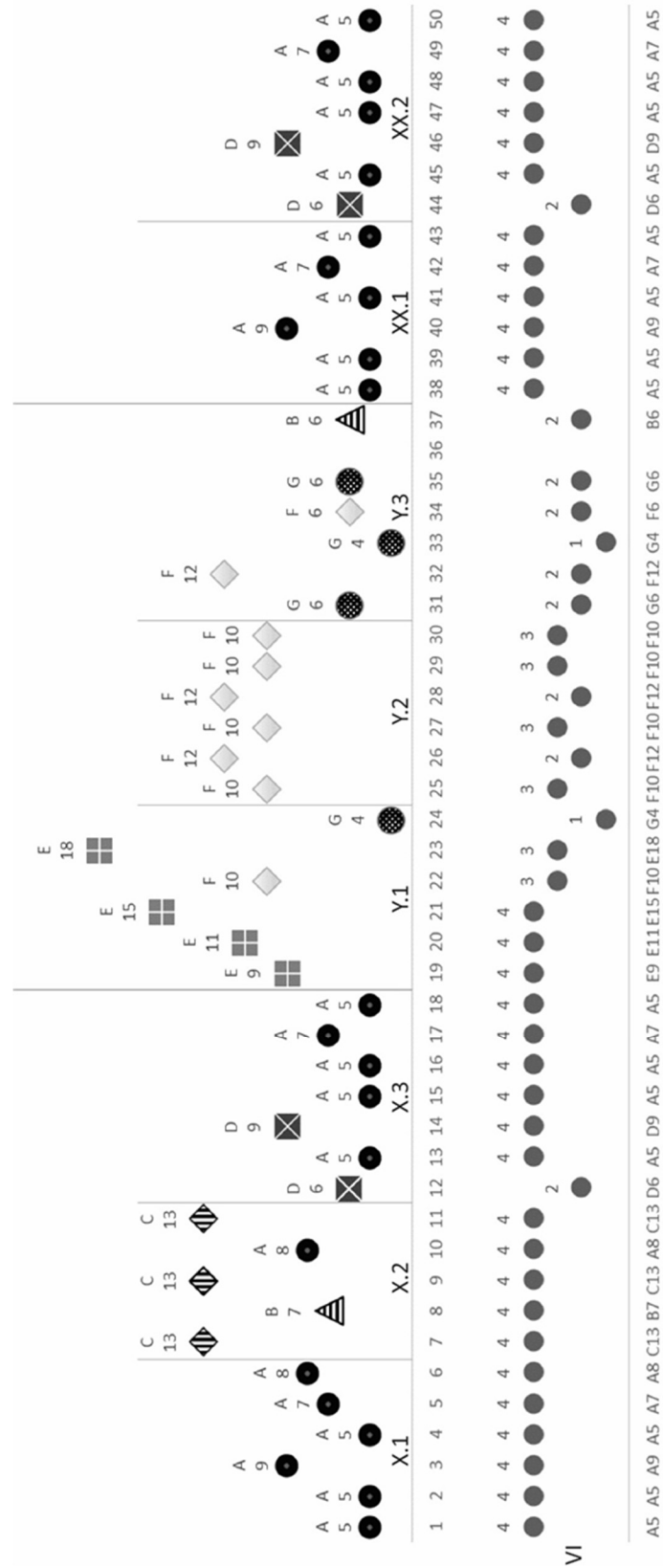
Example 3.13. A re-barred reduction of the “Glorification of the Chosen One” (Stravinsky, 2005)
(continued)



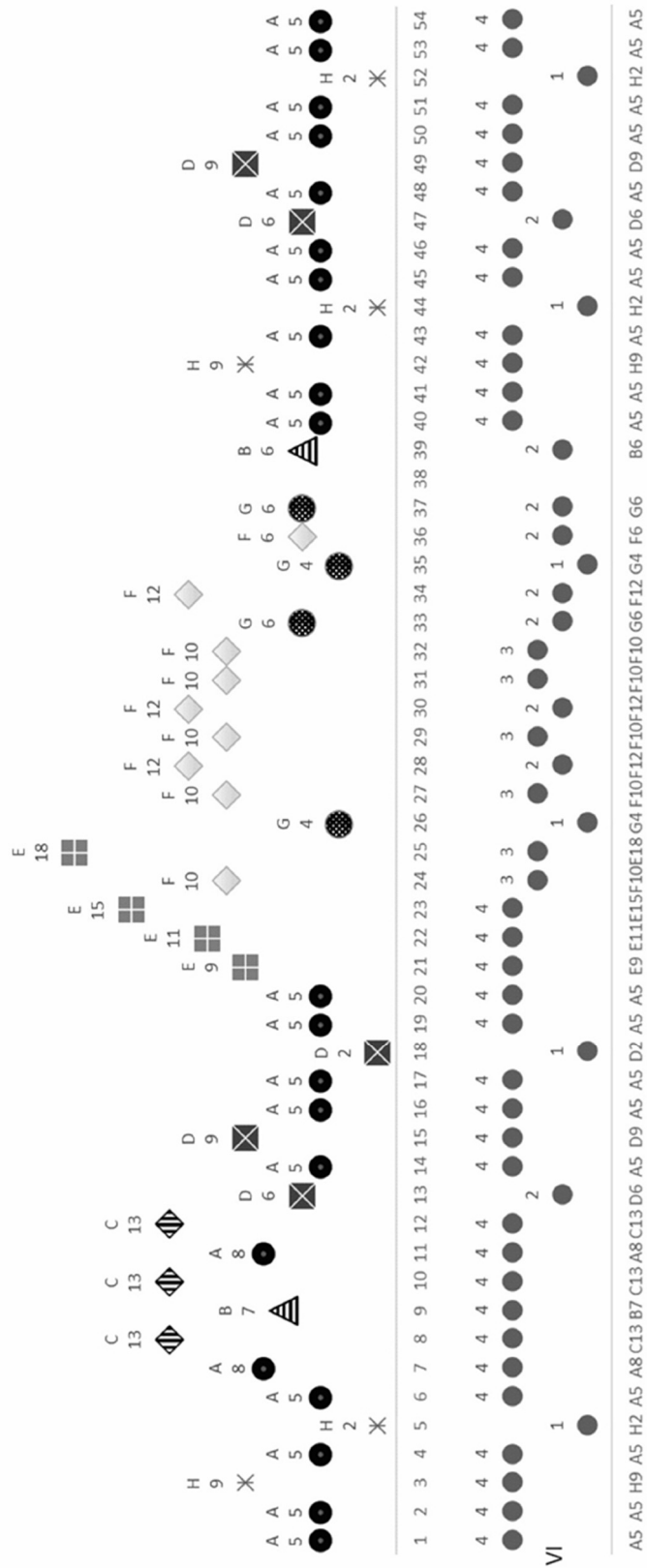
Example 3.14. A motive map for the “Glorification” distinguishing “motif (x)” from not-“motif (x)”

between its few motives; the “Glorification,” on the other hand, exhibits ambiguous relationships and the potential for a significant number of discrete motives. This analysis will consider two extreme solutions to this problem: the approach of the “parser,” who utilizes metric, rhythmic, textural, and timbral information to divide the motif (x) representatives into as many discrete motives as possible; and the “conglomerator,” who treats motif (x) as a motive proper and interprets all black dots in Example 3.14 as instances of the same motive, motive A.

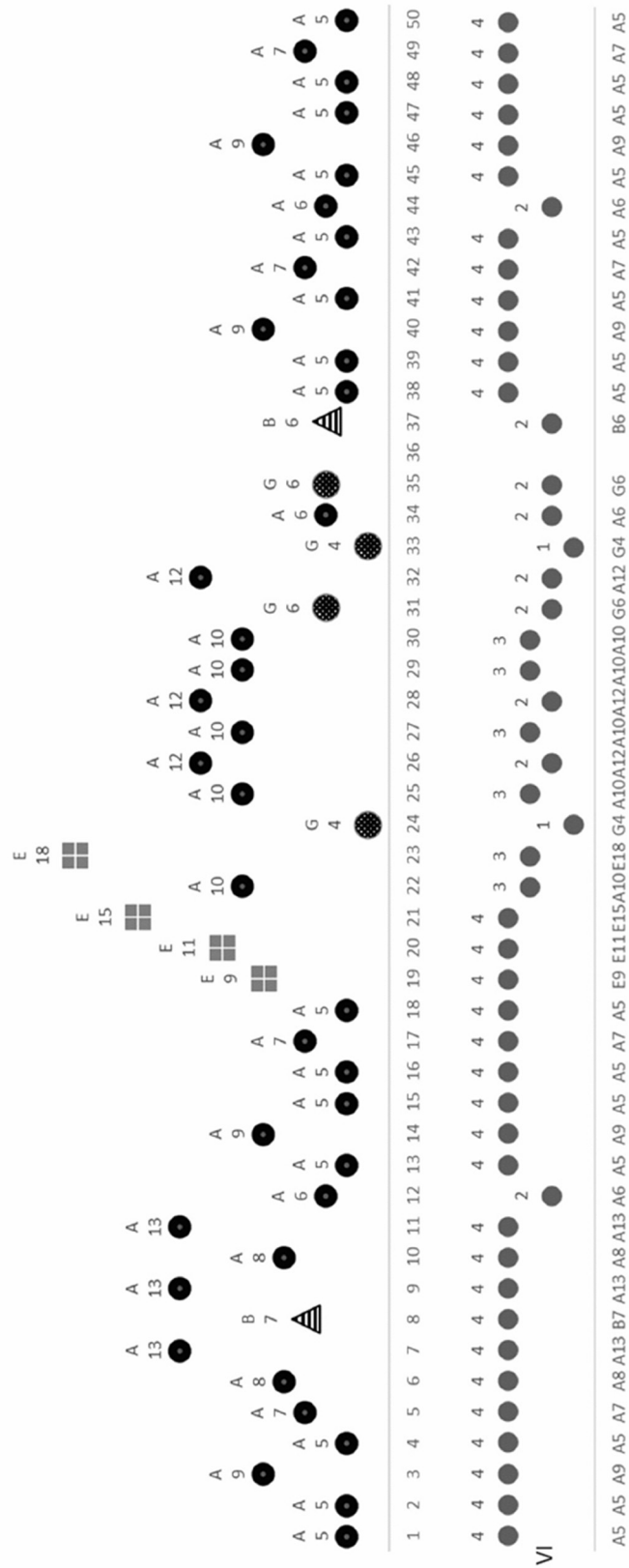
Before describing these poles, we must consider some general features of the formal and metric structure of the “Glorification” scene, a new motive map of which is given as Example 3.15a. This example features motivic ascriptions in line with my own personal listening approach, which threads a middleground between the opposing extremes of the parser and conglomerator; these labels correspond to those provided in the score of Example 3.13. This “moderate” approach will serve as a reference point, providing a set of labels enabling discussion of the musical structure. Yet it must be kept in mind that these ascriptions are variable and tentative, as were those used with regard to the “Evocation of the Ancestors” scene analyzed in Chapter 2. Regardless of the specific labels used, the “Glorification” is clearly divided into three sections in a loosely ternary form, labeled in turn X, Y, and XX, as shown in Example 3.15a. As in the final section of the “Sacrificial Dance,” there is substantial motivic distinction between the various sections and subsections here. The first large section comprises four motives, though overall it is clearly dominated by A, which accounts for two-thirds (12/18) of all motive statements. Section Y also features a dominant motive, F, though this accounts for only about half (9/17) of section Y statements; F shares this middle section with only two other motives, rather than three, making Y somewhat more motivically unified than X. Finally, the material of section X returns to round out the scene, in varied form as XX. Motive A is even more dominant here than in X, accounting for about 80% of all statements (11/14).



Example 3.15a. A motive map and VI values for the "Glorification," "moderate" approach



Example 3.15b. A motive map and VI values for the “Glorification,” “parser” approach



Example 3.15c. A motive map and VI values for the "Glorification," "conglomerator" approach

Section X divides neatly into three subsections. The first of these, X.1, contains nothing but A, which establishes the clear preeminence of the 5-unit, as A₅. This motive increases in length irregularly over the course of this subsection, which paves the way for the substantial 13-unit C motive, signaling the onset of—and comprising the majority of—the next subsection, X.2. Although X.1 lacked in direct metric continuity, with the exception of the twice-repeated A₅ that initiates the scene, it did feature similar lengths of 5, 7, 8, and 9. X.2 upends this quasi-consistency. Instead, C₁₃ acts as an unwavering pole, alternating with motives of different length and identity (B₇ and A₈). Metric relations were relatively evenly distributed in X.1, yet the stark contrasts between C₁₃ and intervening motives cause a majority of connections in X.2 to feature no relation at all—an even more perceptually difficult relational situation. Finally, the arrival of D signals the beginning of X.3; although a second D does appear in this subsection, the motive is quickly supplanted by A, which returns full force to dominate the rest of X.3 as A₅, with the exception of a single A₇ in m. 17. The entirety of X is monopolized by complex meters of the maximal variability index (VI) 4 value; only the D₆ that initiates X.3 drops the VI value to 2.³⁴ To add to this complexity, there is a nearly even distribution of metric relations throughout X as a whole, with some preference for Ordered subset/superset (O) relations, thereby preventing any consistency from arising and stabilizing metric shifts.³⁵ This level of metric complexity dwarfs anything seen in the “Sacrificial Dance,” which featured a much more variable arrangement of VI values. And given this near invariability, correlating VI with metric length is trivial. X presents an arch form, wherein C₁₃ of X.2 serves as a peak complexity plateau at the top. The above-noted progressive length increase at the end of X.1 comprises the ascent; in place of a smooth descent, motive D abruptly drops the length back down to X.1 levels at the same moment that it drops VI to the single low value of 2. Just as A returns to overtake

³⁴ The A₈ statement at the end of X.1 remains VI 4 because, as a result of metric inertia from the preceding motive forms, the intermediate pulse of this A₈ is likely to be felt as (323) rather than (2222).

³⁵ The majority of these O relations occur in X.3, ramping up the presence of O as a way of transitioning into section Y.

D in the course of X.3, so too is the stabilizing promise of D squashed by the return of A, when D's second instance, D₉ (2223), conforms to the VI 4 norm that concludes the section.

Section Y tells an entirely different story, fulfilling the section's role as creator of contrast in the overall "ternary" form. None of the motives that appear in X or XX appear in Y, and none of Y's motives appear in X or XX; there is complete motivic separation between these major sections of the scene. As we'll see, the sections are metrically differentiated, as well. That section Y is the start of something new is patently obvious at the arrival of motive E; a shocking timpani blow creates ripples through the rest of the orchestra in three successive, progressively longer statements. A new motive F, which will come to dominate section Y, interrupts for a single statement before E returns as E₁₈, the longest statement yet, dwarfing even the C₁₃ of X. Interestingly, although the submotivic sections of E are certainly not balanced in terms of span, they are reliant upon one another in a dependent relation of cause and effect. This final massive E statement loses its first submotive, the initiatory 3-unit timpani blow, effecting motivic liquidation that allows new material to come to the fore: a new annunciatory motive G, superimposed over the continuing undulations of E, heralds the conclusion of subsection Y.1.

Motive E, having all but fully taken over across subsection Y.1, wipes away the listener's X-derived expectations and paves the way for something new. Having fulfilled this function, it disappears, and does not make a return; in its place, the new motive F arises, achieving a similar level of consistency so that the listener may take a break from predicting *what* motive will follow, and may focus fully on the *when*. Along with this new dominant F motive comes a drop in average metric length, as well as average VI value. These lowered VI levels mark a major metric difference between sections X and Y. Whereas X is maximal VI 4 throughout, with only one exception, Y begins by first reaffirming and intensifying that level of metric complexity with E (since, given high VI, length correlates with difficulty) before F precipitates its decline at the close of Y.1. F₁₀ presents the somewhat rare VI 3—not seen in all of the "Sacrificial Dance"—and the responsive E₁₈ follows suit. As if to emphasize the significance of this

moment, the new annunciatory G_4 motive takes metric stability (and short duration) to an extreme with one of only two VI 1 events in the entire scene—the other is also a G_4 , appearing in Y.3. Subsection Y.2 consists of a nearly regular alternation between two forms of F, F_{10} and F_{12} —VI levels of 3 and 2, respectively—both very metrically stable relative to the overwhelming complexity of X. This middle section of the middle section provides a much-needed break from the unpredictability of what came before, in four ways important ways. First, the unimotivic structure is significant in light of the preceding sections, hearkening back to the much more metrically complex, yet similarly unimotivic, X.1 subsection. Second, Y.2 features regular alternation on a scale not yet witnessed in this scene. X.1, X.3, and Y.1 were highly irregular; and while the central X.2 section of X did feature alternation in which one of the poles was regular (C_{13}), the other was unstable, both motivically and metrically. Third, and crucially, the absence of VI 4 meters throughout all of Y.2—and indeed also Y.3—causes the quarter-note pulse—the next-slower pulse adjacent to the unit pulse—to remain invariant from the first appearance of F_{10} at the end of Y.1 to the reemergence of motive A at the beginning of section XX. This an extremely substantial boost in metric stability that, spanning all of Y other than its brief E-based introduction, differentiates this central section substantially from the X-material sections that border it, acting as a bringer of respite within this overall extremely metrically complex and unpredictable scene. And fourth, contrasting with the even distribution of metric relations in X, Y is highly focused. Connections between meters in Y.1 are only the loose Ordered and Unordered subset/superset relations (O and U); this subsection acts as a connecting bridge between X.3, which privileged O, and the remainder of Y, which features only U connections other than a single instance of Identity (I) each in Y.2 and Y.3.

Y.2 does mark the peak of motivic stability, but not metric—that honor belongs to the final Y.3 subsection of Y, which features only meters of VI 1 and 2. The subsection is brought on by the change that occurs near the end of Y.2: the alternation pattern between F_{10} and F_{12} is disrupted after two iterations by an unexpected repetition, $F_{10}F_{10}$. As motive G ushered in this period of stable F dominance,

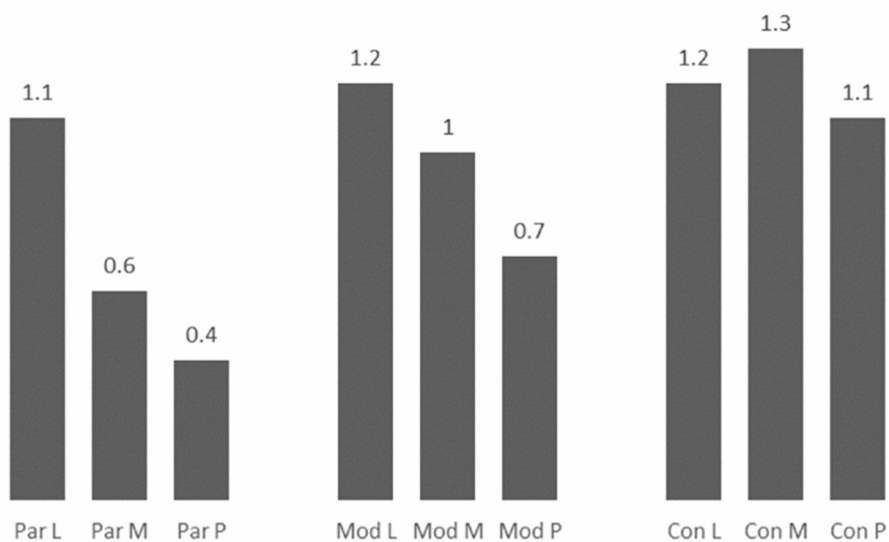
so G returns to announce the beginning of the relatively metrically stable subsection Y.3. As the transition into Y.2 was not smooth—one instance of F preceded it—so too does F linger into Y.3, in its more stable F_{12} form of VI 2, and one new truncated form, F_6 , which creates a smooth connection to the G_6 that follows it and concludes Y. G is more prominent here than in its single annunciatory moment at the end of Y.1, occurring three times alongside F's two. Following the final G_6 statement of Y.3, a span of five eighth notes marked *Molto allargando* disrupts the unit pulse, making MDM listening impossible. This collapse is the only break from an MDM experience in the entire scene, and as such, marks the conclusion of the tension-relaxing process initiated by motive F. After the extreme complexity of X, motive F reduced the VI to 3 at the end of Y.1. In Y.2, it then brought about unimotivic and metric stability, with VI values of 2 and 3 and a stable quarter-note pulse. Motive G joined to further reduce metric complexity in Y.3, after which a break from the MDM listening experience marks a point of maximal respite, however temporary it may be.

As elsewhere in the scene, a vacuum will not stand; following this brief interruption—and the much larger interruption represented by Y as a section—motive A returns, and with it, section XX. Although technically ushered in by the amorphous motive B, this motive statement is tenuous at best, serving more so to re-establish the unit pulse and re-transition back to a full MDM context. Given that A_5 feels like the true moment of thematic “return” and the start of the section proper, XX is then composed of two motives only, A and D. Motive C, as well as the full and partial B motive statements that support it, have been removed; in fact, all of the X.2 material is cut from XX. Otherwise, XX.1 corresponds to X.1, and XX.2 to X.3, with only a single alteration: the A_8 motive that concluded X.1 has been replaced with the normative A_5 value. The reason for this change is clear; whereas A_8 functioned as part of a progressive increase $A_5A_7A_8$ that prepared the listener for X.2—both the length of C_{13} and the presence of A_8 nestled between its instantiations—the absence of corresponding X.2 material makes such a transition unnecessary. The A_5 value functions quite differently, reasserting the normativity of this

motive form and, in the process, highlighting the unbelonging of D_6 , which now appears sandwiched between A_5 statements, as does the D_9 that follows shortly thereafter. Motive D hinted at metric stability in X.3, but ultimately left the listener wanting; in XX.2, the situation feels even more bleak. D_6 , the sole non-VI 4 statement in all of XX, is caught between two statements of the difficult A_5 motive that remains dominant to the scene's sudden and unprepared conclusion.

It was noted above that section X presented a metric length arch form, with the three C_{13} statements of X.2 serving as a plateau at the peak. Although the return of X material in XX will likely bring with it the expectation of similar metric development, the removal of this central subsection enables a different experience, revealing the underlying metric similarities between XX.1 and XX.2 that were concealed in X (between X.1 and X.3) by the intrusion of the contrasting X.2. In fact, XX.1 and XX.2 feature identical distribution of meters (4 instances of (32), 1 of (222), 1 of (232), and 1 of (2223)). Sequencing and motivic identity vary, but not so significantly that parallelisms must go unnoticed; the final $A_5A_7A_5$ that concludes each subsection is in any event identical. The other non-5-unit statements do differ in motivic identity: XX.1 contains B_6 and A_9 , in contrast to XX.2's familiar D_6 and D_9 forms that appeared in corresponding places in X.3. Of course, although identity of overall form distribution is experientially meaningful, exact sequencing of meters is paramount in the overall process of expectation formation and subversion. In fact, the sections are distinguished by only a single shift: the peak 9-unit statement in XX.1 is preceded by two A_5 statements and followed by one; in XX.2, it is preceded by one and followed by two. This has the effect of smoothing the already largely even distribution of metric relations observed in X. Since consistency of relations facilitates prediction, a smoother distribution produces a more metrically difficult experience. XX.1 and XX.2 are therefore very metrically similar—though expectations will differ, as a result of motivic identity, as discussed below—with XX.2 ramping up the difficulty slightly relative to XX.1 to round out the section and scene.

With this overview of the formal structure, motivic organization, and metric flow of the scene in mind, we can now return to consider the experiential differences between the three approaches to motivic identity outlined at the beginning of this analysis. We have so far been considering what I have labeled the “moderate” approach, which describes my own metric-motivic experience of the music. This parsing strategy sits between two extremes: the parser, which is hyper-attuned to difference and quick to separate motives, and the conglomerator, which prefers to unite similar musical ideas under a common motivic banner. The motive maps for the extreme approaches are given as Example 3.15b and 3.15c, respectively; the latter contrasts the most sharply with the map analyzed so far in Example 3.15a. The average displacement values for local inertia (L), motivic inertia (M), and prototype (P)-derived expectations for each parsing strategy are given in Example 3.16. Let’s explore each of the extremes before returning to consider how the middle bath balances the benefits and disadvantages of these approaches.



Example 3.16. The average metric displacement values across all sections, all parsing strategies, and all expectation-generation methods

The parser creates a distinction not present in the moderate approach by according additional weight to differences of register, instrumentation, and harmony within specific instances of the

moderate's A motive. In particular, that first A₉ is different in several respects from the A₅ motives that surround it: moving to A₉, several instruments disappear from the texture, the register is lowered, the harmony is slightly changed, and the characteristic grace note figure is absent from the second eighth note. Despite certain shared commonalities, the parser grants significance to these changes and here creates a new motive, H₉, which references A while contrasting with it. This distinction then creates a ripple effect: all of the A₇ motives in the moderate approach consist of an initial 2-unit "fake-out," followed by the normal (32) contents of an A₅ statement. To the moderate, this is a simple motivic expansion, albeit one of the less common beginning-modifying variety. Yet to the parser, this initial 2-unit is structured much more similarly to H than it is to A; for this reason, each of the Moderate's A₇ motives are split into two, creating the sequence H₂A₅. This occurs four times throughout the scene: once each in X.1 and X.3, and again when those sections return as XX.1 and XX.2.

The experiential consequences of this distinction are not insignificant. First, each instance of H₂ momentarily brings a low VI 1 value into the metric context. These statements are, of course, the maximally-brief span for VI 1 meters, and their stabilizing effect is therefore much less significant than if the low VI value were allowed to continue for a significant number of units. As a result, H is a very stable motive throughout the entire scene, appearing twice as H₉ and four times as H₂, a distribution which clearly highlights H₂ as its prototypical form. The second main consequence concerns the effect on A, which, relative to the moderate approach, loses one of its less common forms (A₇) and gains four new instances of the dominant A₅. Both meters are the maximal VI 4, though A₇ is slightly longer, and this therefore marks a slight increase in prototypicality. More significantly, under this approach A₅ becomes even more dominant than for the moderate, marking itself as the clear prototypical form of the scene's defining A form, and producing much more reliable predictions under both M and P expectation approaches. Furthermore, the presence of A₅ statements enables smoother inertial connections in all

four of the locations in which it appears.³⁶ As is evident in the average values displayed in Example 3.16, the net effect of all of these small transformations is a significant reduction in average displacement, across all three expectation approaches.

The conglomerator functions quite differently. Recognizing the same commonality of materials that Chua described as “motif (x),” this approach considers such “boom chuck” materials functionally equivalent, all united together under the banner of motive A. This produces much more drastic differences from the moderate path, as evident in the motive map of Example 3.15c. The moderate’s motives C, D, and F are absorbed into A, while the moderate’s B, E, and G retain their unique identities. Although the conglomerator provides motivic consistency, the net result of this reduced discernment is a significant increase in metric unpredictability. This is because each of the absorbed motives do in fact exhibit characteristic behavior, which is then smoothed over in the conglomeration, resulting in significantly poorer parallelism-based predictions under both M and P. The moderate’s motive C, for example, always appears as C₁₃; this consistency provides stability to the listener who recognizes it. The moderate’s motives D and F each appear in only two forms each (with the exception of the single F₆ of m. 34), and only one of these four forms is also a form of A in the moderate’s approach (D₉, A₉). These distinctions are all obliterated to the conglomerator, who is presented with an onslaught of “motif (x)” material without clear prototypical form, and which exhibits an overwhelming number of metric forms on a scale unlike anything seen in the “Sacrificial Dance” or any of the music analyzed in Chapter 2. The significantly poorer displacement results displayed in Example 3.16 highlight this predictive inefficiency.

Is the parser then, with its more accurate metric expectations and less jarring entrainment shifts, the preferred listening strategy? Before asserting this, we must consider the principle of cognitive economy. Despite its many disadvantages, the one clear benefit of the conglomerator is the reduced

³⁶ 1) in X.1, m.4 to m. 6 is accurate under M; 2) in X.3, m. 17 to m. 19 is accurate under M, and mm. 17-18 under both L and M; 3) in XX.1, m. 42 to m. 44 is accurate under M, and mm. 44-45 under L and M; and 4) in XX.2, m. 50 to 52 is accurate under M, and 52-53 under both L and M.

number of discrete motives of which the listener must keep track; four motives are certainly easier to keep tabs on than the parser's eight. Those benefits may be outweighed in the drastic case of the conglomerator, but what of the more subtle difference in both motive number and displacement values between the parser and the moderate? Here it seems clear that, although the listening experiences may be clearly contrasted from each other along various criteria, there is no clear way of determining which is easier to entrain. As Examples 3.15 and 3.16 make clear, each has its own advantages and drawbacks; a listener may gravitate towards one or the other depending on the preferences they bring with them into the listening experience. Yet regardless of preferences, it must be remembered that these tools are primarily aimed at first-time listeners and the learning process in general; the question of the easiest and most stable end-state experience is not addressed here. Although familiarity will result in more and more accurate expectations beyond the quasi-automatic L, M, and P approaches, the innate force of metric inertia will inevitably persist. It may then be the case that those strategies which afford smoother adjacent inertial connections will provide an experiential advantage, even after a listener fully learns and successfully predicts every single motivic statement. The parser does have a small advantage under L inertia, as seen in Example 3.16, though the significance of this difference is unclear. The much more striking benefits of the parser's M inertia are the clearest point in favor of this strategy, though the long-term relevance of M is much less certain than that of L. In any event, it's quite clear that the listener's perspective on the "motif (x)" material is of paramount importance for their metric experience of this striking scene.

III. THE *SONG OF THE NIGHTINGALE*: I. "THE FEAST AT THE EMPEROR'S PALACE"

Whereas the "Sacrificial Dance" and the "Glorification of the Chosen One" have, as detailed above, attracted previous analytic attention, the *Song of the Nightingale* has not, to my knowledge, been analyzed in a music-theoretic capacity in any published literature. Of course, as key memorable moments of the extremely well-known *Rite of Spring*, it should come as no surprise that the former scenes have drawn attempts to explain the experiential power they wield. Stravinsky's early opera *The Nightingale*, on the other hand—from which the *Song of the Nightingale* is derived—has not achieved nearly the same level of influence upon twentieth-century music. Begun in 1908, Stravinsky put *The Nightingale* on hold in order to work on the *Rite of Spring*, returning to the opera after the *Rite's* premiere, and finishing it shortly thereafter in 1914.³⁷ The material of the symphonic poem *Song of the Nightingale*, completed in 1917, is fully derived from the earlier operatic work. I will therefore consider the *Song of the Nightingale* to be roughly contemporaneous with the *Rite*, representing the composer in the throes of his "Russian Period" aesthetics, grappling with similar technical preoccupations in a strikingly different musical and programmatic context.

If the "Glorification" problematizes motivic identity, the "Feast at the Emperor's Palace," the first movement of the *Song of the Nightingale*, threatens to redefine the concept of motive as I have deployed it thus far in this dissertation. To this point, rhythmic-melodic complexes have constituted the essential materials to which motivic ascriptions become attached, be it as impressions in the listening process or as the definite letters operationalized in the course of analysis. In the "Feast," timbre rises to the fore as a fundamental, co-equal determiner of metric boundaries, raising issues of textural continuity, problematizing the role of explicit memory, and requiring a flexible implementation of the

³⁷ Maureen Carr, "Stravinsky at the Crossroads after *the Rite*: 'Jeu De Rossignol Mécanique' (Performance of the Mechanical Nightingale) (1 August 1913)," in *The Rite of Spring at 100*, ed. Severine Neff, Maureen Carr, and Gretchen Horlacher (Bloomington; Indianapolis: Indiana University Press, 2017), 339.

techniques used so far in this chapter. Whereas the formal structures of the *Rite* scenes were extremely clear, the “Feast” presents a much more amorphous structure. The score to the movement is given in reduced and re-barred form as Example 3.17. Although instrumentation has not played a significant role in our analytic work so far, instrumentation markings are of great significance here; indeed, in many cases sharp shifts of instrument groups are the main determinants of motivic arrival points. Overall, there is a clear binary sectional division to the movement, which then concludes with a brief coda, as related in Example 3.18. The Y material is fundamentally different from that of X in nearly every parameter, including tempo, meter, motivic material, and instrumentation; and while X affords MDM, as a result of its slow tempo Y probably does not, despite the very perceptible notated metric changes. This analysis will focus on X and the brief X-based coda that follows Y and reprises one of X’s primary motives. Example 3.17 notates only X and, following the solid barlines in the penultimate system that represent the not-notated Y section, the brief X-based Coda. Although the high-level binary structure is evident, parsing the X material into discrete sections is a more fraught task.

Example 3.19 presents a motive map that describes both X and the X-based Coda. A few initial remarks are in order, for several features distinguish these maps from those of the *Rite*. First, in order to facilitate ease of reading, the length counts in this map have been halved relative to their actual values. In other words, although the notated eighth note is the actual unit pulse throughout this material, the quarter note is also a stable, invariant pulse—a vital fact to which I return below—and it is these quarter note counts that are given in the Y-axis of Example 3.19. Second, as noted above, this example problematizes the definition of motive in several ways, particularly in the non-repetitive and non-recursive succession of materials that characterizes X. I have elected, in the context of this movement, to restrict the definition of “motive” to those events which occur at least twice; as a result, there are five points marked “none” (n) in the motive map.³⁸ These are each events with clear metric boundaries,

³⁸ See Chapter 1 for more on the role of repetition in the formation of motivic identity.

The image displays a musical score for the piece "Feast at the Emperor's Palace" by Igor Stravinsky. The score is presented in a re-barred reduction format, consisting of four systems of music. Each system begins with a measure number in a box: 5, 6, 10, and 13. The first system is for the orchestra (orch) and features a tempo marking of 144. The second system includes a clarinet (cl) and a piano (p) part, with a mezzo-piano (mp) dynamic marking. The third system is for the strings (str) and piano (p), with a piano (pp) dynamic marking. The fourth system is for the orchestra (orch) and features a forte (sf) dynamic marking. The score is written in G major (one sharp) and 2/4 time. The notation includes various musical symbols such as notes, rests, beams, and dynamic markings. The re-barred format is used to simplify the complex rhythmic patterns of the original score.

Example 3.17. A re-barred reduction of the "Feast at the Emperor's Palace" (Stravinsky, 1921; Stravinsky, 1927)

Musical score for "Feast at the Emperor's Palace" (Stravinsky, 1921; Stravinsky, 1927) (continued). The score is a re-barred reduction showing measures 31 through 36. It features multiple staves for various instruments: strings (str), woodwinds (ww), cellos (cel), violins (vn), oboes (ob), horns (hn), and orchestra (orch). The score includes dynamic markings (pp, f, mf, p, f) and articulation (accents, slurs). Measure numbers 31, 34, and 36 are indicated at the start of their respective staves. The score is divided into systems, with measures 31-33, 34-35, and 36-37. The key signature is one sharp (F#). The time signature is 3/4. The score is labeled with measure numbers in boxes: F'3, C6, C8, D4, D5, D6, E10, and E11. The score is also labeled with measure numbers in boxes: E.16, E.2's, E.2''6, and E.2's. The score is also labeled with measure numbers in boxes: E.16, E.2's, E.2''6, and E.2's.

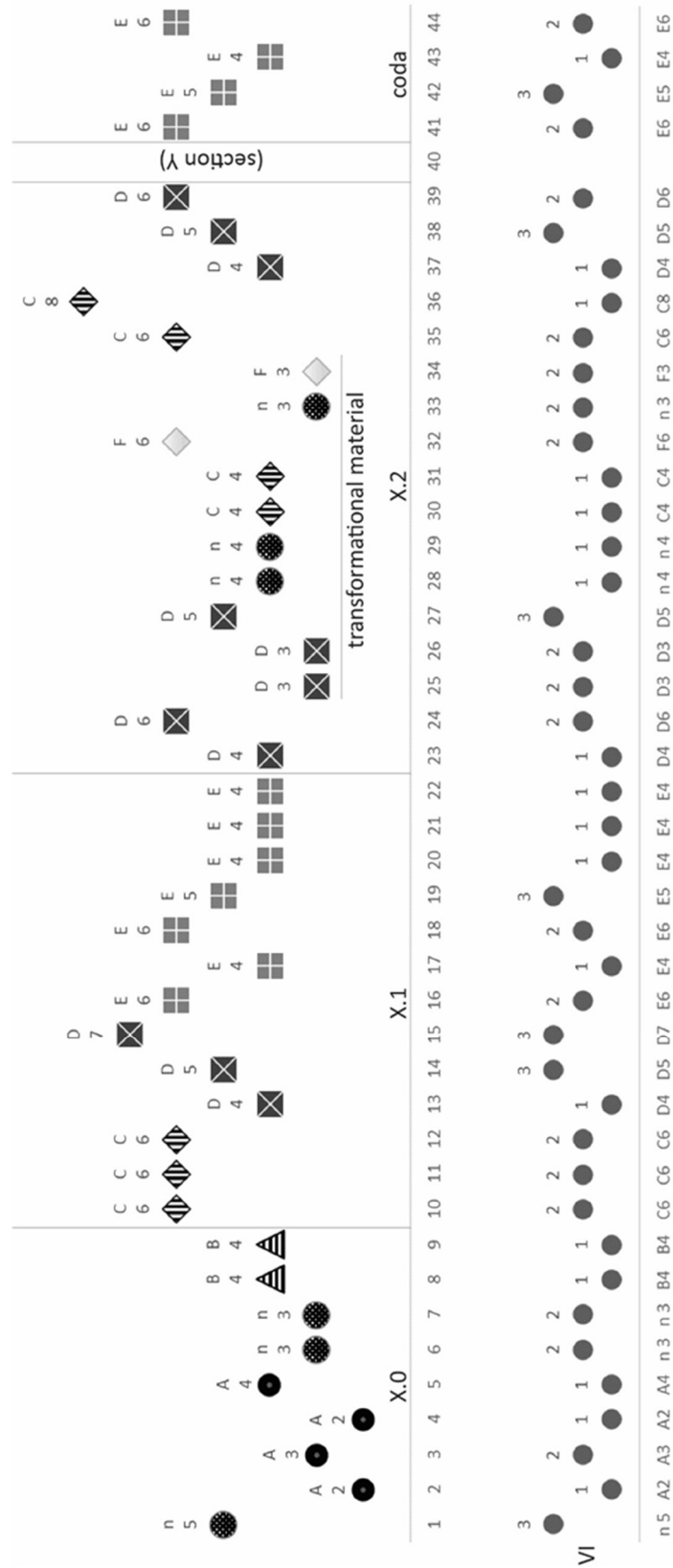
Example 3.17. A re-barred reduction of the "Feast at the Emperor's Palace" (Stravinsky, 1921; Stravinsky, 1927) (continued)

Measures (notated)	Section
1-4	Intro
5-83	X
84-98	Y
99-107	Coda (X)
108-110	Transition

Example 3.18. The form of the “Feast at the Emperor’s Palace”

marked off from the material that surrounds them, the likes of which are not seen at any other point in the movement and therefore, although perhaps quite distinctive, cannot be considered motivic statements. Third—and now approaching a discussion of the actual materials of the movement—whereas motive A was a recurrent and foundational structure in both of the *Rite* scenes, in the “Feast,” A is a brief event here that occurs four times in a row, and never again. B likewise appears only twice, and never reappears at a later point in the movement. Scanning the map, it’s quite clear that block presentations of motives are the norm. Gone are the dialogic interactions, the back-and-forth alternations such as those seen in the “Sacrificial Dance.” Instead, we are met with something more akin to pure succession. Each block provides a brief moment of motivic familiarity—sometimes paired with localized metric stability—but the overall progression of blocks approaches the ever-new, even when certain blocks recur in varied form later in the movement.

Consideration of motivic blocks leads us to ponder the overall form of X. Although not as neat as the sections and sub-sections of material in the “Glorification,” certain features do suggest perceptually available formal divisions. The first 9 statements—four of motive A, two of B, and three “none”—present material that never returns at a later point in the scene. Additionally, the materials of the “none” statements of mm. 6-7 are very halting in nature, echoing the borderline unpulsed opening materials of the movement that precede the notation provided in Example 3.17. Furthermore, motive B is a motive in the loosest possible sense, and might better be described as a rather undistinctive spinning-out of introductory or accompanimental materials. For these reasons, the first 9 statements



Example 3.19. A motive map for section X and the X-based coda of the “Feast”

feel very introductory—a kind of coalescing of pulse, meter, and motive out of the much less differentiated materials of the un-notated beginning. Compounding and cementing this feeling is the appearance of the distinctly melodic motive C at the beginning of the next section. B feels like a lead-in to this moment, and C as a clear moment of arrival that, with its three repetitions of the same span, provide a point of stability: the destination of the preceding coalescing activity. Because of its introductory nature, I will label this first subsection “X.0,” and the subsection which follows “X.1.” This motive C that initiates X.1 is made more significant by the repetition of its block at two later points in the movement, producing seven statements of C in total. This block repetition is a feature shared by the next two motives as well; D and E appear in their own respective motivic blocks, and both blocks recur (in varied form) at a later point in the movement, marking them as much more important than the passing opening A and B motives.

The next boundary, dividing sections X.1 and X.2, is less clearly articulated, though motivic and metric behavior does clearly change around the midpoint between the beginning of X.1 and the onset of Y. I will describe this as a range of statements in which a listener is likely to perceive a sectional change. The earliest is probably the appearance of D₄ at m. 23; this is the first moment at which the succession of new motive blocks ceases as we return to previously-heard motivic material (D). The latest I think this shift likely to occur is at the “none” statement of m. 28. This is the first “none” instance since those of X.0, and while those statements projected a more chaotic, transitory, and introductory character, this clear trumpet melody shines at the surface for a striking moment, contrasting sharply with the material bordering it before and after. Note, however, that the majority of statements in X are unaltered, other than normal MDM durational manipulation; yet across mm. 25-34, 6 of the 7 statements are altered statements (marked with prime symbol)—the only original form is the first instance of a new motive, F, which only appears twice, both times within these ten bars: the original form in m. 32, and the altered in m. 34. With its non-block form and non-recurrent behavior, this passage—like the “none” of m. 28—

recalls X.0. These 10 bars act like a kind of motivic “transformation” section, which would be split between X.1 and X.2 if the “none” of m. 28 were felt as the boundary point. The motive D block spanning mm. 23-27 begins normatively but moves to truncated prime forms in the middle of the block; nevertheless, this shift is not particularly stark, and does not therefore make a very compelling boundary point between subsections of X. Nor need it be, for X.2 clearly does not end when the “transformational period” ends—neither must they begin together. For these reasons, and in order to have a clear boundary to discuss, I consider X.2 to begin at the onset of the D block in m. 23; ultimately, though, it’s clear that the D block is transitional in nature. As we will see, X.1 and X.2 exhibit notably different metric, as well as motivic, behaviors.

Motive E presents another problem not yet encountered in the scenes from the *Rite* analyzed thus far. Given its breadth, lyricism, and metric stability, the motive might be better described as a proper theme, comprising an entire phrase and composed of multiple similar, though separate, motivic units. If we treat E as a theme rather than a motive, its total appearances are only six instead of the eleven described in the motive map of the movement. These six appearances are what are notated in Example 3.17. Every statement of the E theme is clearly distinguished from the material that surrounds it. Even when multiple statements are presented in succession, changes of instrumentation, register, dynamics, and articulation make the divisions unambiguous. Within each theme, however, the internal metric structure is much less clear. One quite plausible option is strongly inertial, in which a listener maintains duple groups (notated half-note pulse) whenever possible, only readjusting this when necessary to realign with one of the clear theme onset points described above. This inertial strategy will be explored below, when we consider a more inertial approach to the movement as a whole. On the parallelistic end of the spectrum, the listener may observe the motivic structure of the theme outlined by the labeled horizontal lines below the staff in Example 3.17 and develop metric expectations accordingly.

A few features of these labeled lines require explanation. While nearly all theme presentations are divisible into two motives, labeled here E.1 and E.2, one fragment at the end of the fourth statement does not correspond to either clearly. The last three quarter notes of this statement are an expanded version of the final two quarters of E.2; and as discussed relative to the B motive of the “Sacrificial Dance,” beginning-truncated motives are difficult to recognize. In labeling this fragment, then, I have assumed that even a parallelism-oriented listener may, upon first hearing, initially approach the first E₁₀ with inertial duple groups, and only retrospectively, after the repetition provided by the following E₆, recognize the E.1/E.2 division. If this is the case, E₁₀ will first be heard as the (442) grouping labeled as “Ev1” segments in Example 3.17. If so, that odd three-quarter group at the end of E₁₂ may be heard as an expanded version of Ev1.3.

The second interesting feature of E concerns the effect of the single-beat expansions evident throughout. Each 5-unit statement emerges as a result of an extra quarter note appended at the end of a prior 4-unit; the final E.2₆ motive of the final E₁₀ is furthermore the result of a second quarter note appended on top of the already-expanded E.2₅. The first expansion, occurring in the third E theme statement as E.2₅, is very clear, as a result of the orchestral changes referenced above that make the next arrival point unambiguous. A listener who recognizes this addition and the inclusion of that final quarter into E.2 runs into a unique problem in the fourth and sixth E theme instances—E₁₂ and E₁₀, respectively. Whereas the other statements of the E theme present the expected (E.1, E.2) series, these two statements begin with two successive instances of E.2, the first of which is expanded to E.2₅ in both cases. Motivically, this creates a clear point of elision, as the checkered boxes in Example 3.17 show, in which a single quarter note functions simultaneously as the final quarter of the first statement and the first note of the following. Yet metrically, a single timepoint cannot simultaneously have multiple metric depths. The solution is simple: a listener pursuing this sort of parallelistic hearing will initially feel the elided note as metrically weak, then retrospectively reinterpret it as maximally strong (a motivic arrival)

once its initiatory role is recognized. Representing only the end-state hearing, this elided structure has the net effect of normalizing the irregularities of E_{12} , converting the groups indicated in Example 3.17 to the much more normative (444). As a result of the atypical thematic behavior of E, I treat its various motivic subcomponents each as instances of the generalized motive E. A fully inertial approach to E is considered below.

Even under a parallelistic, fully MDM listening strategy, the considerable metric depth that may be reached in the “Feast” is probably its most distinctive quality relative to other MDM excerpts of comparable length. This metric depth has significant perceptual consequences, as we will explore alongside a narrative exposition of the movement’s metric and motivic unfolding. Scanning the motive map of Example 3.19, one clear consequence of the dual stability of the eighth and quarter pulses is the fact that meters of variability index (VI) 4 are impossible; all meters in the “Feast” range from VI 1 to a maximal level of VI 3. And indeed, just as VI 3 is relatively rare in more normatively MDM musics—seen in the “Glorification,” but not the “Sacrificial Dance” or any excerpts from Chapter 2—so too is it uncommon here, describing only 16% (7/43) of motive statements. The substantial majority of meters in this scene are instances of the relatively stable VIs 1 and 2. Many of those that reach up to VI 3 draw attention to themselves by upending slower pulses that are in the process of becoming.

As discussed above, the introductory X.0 section is motivically irregular, consisting of two motive blocks (A and B) and several “none” (n) instances, which comprise 33% (3/9) statements of the section. X.0 begins with n_5 , one of the movement’s VI 3 meters, which sets a precedent that has the potential to feel fulfilled by the A_2A_3 pair that follows and—until it ends up being one quarter too long—the subsequent A_2A_4 set. Motive A is very clear in its submotivic components and onset points. While overlaying these passages with a van den Toornian background periodicity is possible, it seems less likely that instances of A might be grouped together to form a higher metric unit, as might those of B. The two instances of n_3 in mm. 6–7 threaten to upend the unit pulse—the first by pausing for three quarter

pulses, and the second in its scattered durations that temporarily replace the eighth-unit pulse with eighth triplets. Yet in combination, n_3n_3 produces a higher-level 6-unit pulse, as did the preceding A_2A_4 set, raising the possibility for a duple pairing to give rise to a 12-unit pulse. This gradual shift in favor of triple relations (VI 2 meters) is counteracted by the B_4B_4 set that concludes the introductory section, a pure duple pairing enabling the appearance of the stable 8-unit for the first time in the movement. Overall metric relations are evenly distributed throughout this section, and, because of this unusual metric structuring, even the progression from local inertia (L) to motivic inertia (M) provides no predictive advantages—yet given the consistency of B in particular, the shift to prototype (P) predictions shifts the average metric displacement from .5d to .17d.

The possibility of settling, post-introduction, into a stable pure duple framework receives contradictory cues at the onset of X.1. In hindsight, it is fully thwarted under a parallelistic hearing, given the VI 2 C_6 and the triple motive set, $C_6C_6C_6$. Yet the metric structure of C and its repetitions is initially rather vague, and allows pure duple to persist for some time before the repetitions of C make clear the presence of triple—and indeed, given the total duration of the triple set as 18 quarter notes, maintaining pure duple is in any event impossible—motive D forces readjustment. Yet although pure duple does not come into being, the motivic and metric stability of this moment is clear—after all, lacking durational manipulation, the second and third statements of C are both correctly predicted under both L, M, and P expectation sets. Consistent recurrences of meters like this help to bring Identity (I) relations to the fore in section X.1 (4/13), along with Unordered subset/superset (U) relations (4/13), exemplifying the relative stability here. What’s more, this set of C motives marks the culmination of the gradual, if irregular, process of increasing metric length that began with the instantiation of the first motive, A, whose statements average 2.75 units in length; the spans of the “nones” are both 3, Bs 4, and Cs 6 units long.

Motive D arrives to thwart both the progressions of increasing length and metric stability. The first D₄ instance of the motive serves to finalize the triple grouping of C motives and, at the same time, provide the possibility of returning to a pure duple framework. Instead, the D set introduces the most significant metric instability seen since the initial “none” statement that brought the nascent pulse of the un-notated beginning into being, as the second and third statements, D₅ and D₇, raise the VI to the movement’s maximal level of 3. This irregular set can be read as a brief and malformed echo of the increasing length sequence that spanned mm. 2-12; it succeeds in increasing the span to 7, but the VI and metric displacement burdens on the listener are significant; the lyrical and relatively stable E theme/motive group that follows arrives to provide some much-needed respite. The second and third statements of D are not predicted under any expectation scheme, and retain the maximal displacement value of 2d even under P expectations. Interestingly, the behavior of motive D has the opposite effect as might be initially thought: if the group did not exist, and C progressed directly to E, it’s more likely that the continued stability of the half note pulse would enable the listener to hear E *as a theme* rather than a set of discrete motives, as described above. Yet the intrusion of D has the net effect of disrupting and fragmenting the metric structure, and it is within this context and these attendant expectations that the listener arrives at E, well-prepared for smaller motivic units and shorter metric spans.

This brings us back to motive E, which, with its significant metric span and strongly lyrical shape relative to the abrasive instances of D that surround it, may be thought of as the main theme of the movement. As shown above in the labeled horizontal lines accompanying Example 3.17, E.1 and E.2 exhibit quite different behavior and, under a parallelistic strategy, provide the complex metric sequence shown in the accompanying map, which reduces the metric span back down to the 4-unit, which concludes the motivic block, and X.1, with E₄E₄E₄. Although the VI 1 meters and return to a shorter metric span might seem to fulfill the promise of pure duple put forward by B, it fails this on two accounts: first, as a result of the triple statement grouping; and second, because of the timepoint-eliding

means by which these 4-units come into being, which make the final state metric stability of this sub-block fairly deceptive. Nevertheless, despite the metrically complex central D block, X.1 marks a moment of motivic (but not metric) stability relative to X.0 and X.2, and begins and ends with triple sets of metric stability, as well.

The next D_4 statement, as the first instance of motivic block recurrence and a return to angularity after the lyricism of E, initiates the new X.2 section, which alters and develops the material presented in X.1 and introduces only one new motive, F, which—at two disconnected statements—is the weakest motivic unit of the movement. The developments of this section are both metric and motivic. The initial D block begins with D_4 , as did the D block of X.1, which may well set up expectations for the return of that same $D_4D_5D_7$ set. Instead, what follows is the much more metrically normative D_6 , providing the missing gap in the span-increasing progression of the X.1 D block, which, in that position, would have ameliorated the metric difficulty of the latter part of that set. Here, in X.2, it precipitates the fragmentation of D, producing in its wake D' , an altered version which comprises only the second submotive of D, thereby initiating the material I labeled “transformational” in the discussion of the X.1/X.2 boundary point discussed above. But more than this, D_6 provides a transition point between the duple and triple groupings that border it. We saw that the E block concluded with three instances of the 4-unit; the first D_4 statement continues this duple framework. The hemiolic potential of the following D_6 supports the continuation of these duple groups but, in hindsight, the statement more unambiguously expresses (33) rather than (222). This hindsight prepares the listener for the two instances of D'_3 that follow. Yet this local triple stability is short-lived, as D'_5 follows, providing a blend of duple and triple. Whereas D_6 presented duple and triple groupings “at the same time,” D'_5 presents them in succession, as (32). Yet ultimately this “transition” is also realized only in hindsight, once the arrival of n_4 makes the cessation of triple groupings clear. And, like that earlier transition, it fulfills its role well, smoothing in some ways the move from triple back to duple. Looked at from another perspective, it is not D'_5 that

smooths the transition, but the transition that ameliorates the jarring effects of the VI 3 5-unit motive; that is, since the groupings on either side of this (32) mirror that half of its contents, both halves are more easily understood; the first projectively, the second retrospectively.

The fragmentation of D, and accompanying tease of triple groupings, is the first major “transformational” event of X.2. From this point, the fragmentational energy increases, signaled by the annunciatory trumpet call of n_4 , which features a striking syncopated dynamic accent following an unstressed arrival point. Uniquely, the development that follows does indeed fragment and transform the motivic material set up in X.1, yet rather than underscoring and intensifying these changes, the metric structure of this material is notably stabilized relative to the two D blocks that border it on either side. A quite different n_4 , presenting a descending, nearly chromatic scale in the clarinet, echoes the n_4 that preceded it. If this combination of (non-) motivic and metric features were to continue for long, the MDM experience would dissipate, since the lack of repetition discourages looking to motives as a source for motivic information at the same time that the stable 4-unit (of VI 1) removes the need to attend closely to the metric parameter. The continued successful predictions of L-derived expectations make this clear. These non-MDM features are removed one at a time. First, the following $C'_4C'_4$ repetition re-engages motivic listening, albeit briefly. Second, the very distinctive F_6 creates a metric change after four bars of 4-unit meter, which unambiguously marked the most stable passage in the entire movement.³⁹ This F_6 statement is significant for another reason: it is the only motivic (non-“none”) statement to occur in isolation, disconnected from other statements with which it might form a motivic block. A brief and

³⁹ Although the $E_4E_4E_4D_4$ set of mm. 20-23 presents an equal span of 4-unit meters, it is less metrically stable than mm. 28-31 for two reasons. First, mm. 20-23, in addition to spanning two motivic blocks, are not grouped together at the “hypermetric” level; rather, $E_4E_4E_4$ forms a 12-unit, and D_4 initiates a new point of hypermetric arrival, which will be grouped together with the D_6 that follows. In contrast, mm. 28-29 (n_4n_4) and 30-31 ($C'_4C'_4$) produce 8-unit sets, which combine to produce an extremely metrically stable 16-unit hypermetric group. Second, as described in the preceding analysis, the E_4 statements arose as a result of elision and retrospective metric re-evaluation, involving additional predictive complexities not required by the more straightforward metric structure of mm. 28-31.

rather indistinct n_3 of m. 33 interrupts the would-be group, pausing as if to catch a breath before F'_3 echoes the second submotive of F_6 . Although F technically meets the requirements for elevation to “motivic” status I set up at the start of this analysis—at least one instance of repetition—it is certainly the weakest motivic structure in the movement, with only one normative statement (F_6) and a single non-sequential, altered repetition (F'_3). Within the context in which it appears, surrounded by so many “none” statements and fairly removed from the last new motive proper (E, beginning in m. 16), a listener may well not accord F motivic status at all.

Following the $n_4n_4C_4C_4$ period of metric stability and the intrusion of the motive F pseudo-block that returns an MDM context, motive C returns again as the familiar C_6 , followed immediately by the new form C_8 . I’ve indicated a single C_8 statement, instead of a C_4C_4 set like so many other 4-unit pairs found in this movement, because the 8-unit arises as result of an internal expansion within C_6 . Considering each half note span to be a separate submotivic unit, it’s clear that $C_{8.1}$ corresponds to $C_{6.1}$, and $C_{8.3}$ and $C_{8.4}$ to $C_{6.2}$ and $C_{6.3}$, respectively. $C_{8.2}$ is new material that disrupts the metric structure without seriously modifying motivic expectations— $C_{6.2}$ and, especially, $C_{6.3}$ still clearly bear closing function, which makes it unlikely that $C_{8.3}$ ($C_{6.2}$) will initiate a new point of motivic onset, producing the C_4C_4 set suggested above. C_8 , with its combination of low VI (1) and significant length, is in isolation the most stable meter of the movement—yet, appearing as the result of the expansion process, and recognized only in retrospect, it lacks the stabilizing function it might have in a different context. Instead, the internal expansion, respecting both the onset and conclusion of C_6 , gives rise to C_8 . Interestingly, while motive C was the most stable by far of the three main motives of X.1, presented as it was in three identical successive VI 2 statements, it is the motive that is subjected to the most substantial changes in this transformational section. E does not feature here at all, appearing again only in the final coda section, and D features only a brief moment of alteration ($D'_3D'_3$, mm. 22-23) embedded within a larger unmodified D block. A final D block does return to conclude X.2, though, post-

transformational, it features only unaltered form statements. It does provide, with the central D₅ statement, a return to maximal VI 3 after a significant span without the appearance of such a destabilizing meter. This block presents a progressive increase of metric length, steadily reducing tension as a way of producing conclusion to the X material, in preparation for the intervening non-MDM Y section. Overall, given the metrically stable passages described above, X.2 is much more predictable under L than is X.1, providing an average metric displacement of only .53d in comparison to X.1's more substantial 1d. Yet given the quite different treatment of motives in these sections, they actually reverse predictability with increased familiarity: the two sections feature approximately the same relatively high average displacement value under M (.9d and .92d), while X.1 sees a massive benefit under P (.46d) at the same time that X.2 is notably higher under P (.79d) than L. It is ultimately difficult to compare the relative difficulty of X.1 and X.2, since they present such strongly contrasting types of metric/motivic complexity.

Although this analytic project is not primarily concerned with inertial listening experiences, which, tending much more closely toward traditional forms of metric listening, do not generally fit the criteria of Motive-Directed Meter, there are many approaches that lie in-between the extreme poles of the purely inertial and the purely parallelistic. Whereas the "Sacrificial Dance" and "Glorification of the Chosen One" strongly encouraged parallelistic strategies, the "Feast at the Emperor's Palace" is much more accommodating of a broader range of different listening experiences. The MDM experience offered by the "Feast" is much less prototypical than those considered thus far, and for two reasons. First, the motivic structure is less tightly-knit: many statements sit on the border between the motivic and non-motivic, appearing only a few times or in significantly varied forms. Furthermore, the several single-instance "none" statements that clearly do not meet the criteria for the motivic cast doubt upon the rest, weakening the listener's reliance on motives as a source for metric information. And second, the significant size of the "periodic zone" relative to the single-pulse zone of prototypical MDM rewards

inertial hearing. Not only is the quarter-note pulse invariably stable in addition to the eighth-note unit pulse, but several slower pulses may be heard as periodic without doing significant violence to the motivic material. What follows, then, in consideration of a middle-of-the-road, “balanced” approach, bears some similarities to van den Toorn’s “background periodicity” analyses, a style which I have eschewed because the listening experience it describes is at odds with MDM as I’ve defined it. Yet this borderline movement is the perfect place to undertake such an analysis, since a listener may well gravitate towards a more balanced approach. We can contrast the above parallelistic analysis with the balanced listening experience described below.

This balanced analysis describes a listener who maintains, in addition to the truly stable eighth and quarter pulses, the half-note pulse unless presented with strongly conflicting evidence. We will set metric events into two categories based on their relative ability to enact metric realignment, the “probable” and the “possible.” Aside from the events noted in these two categories, this balanced listener will be able to comfortably maintain a half-note pulse. In the “probable” category we have six total events in the movement in which very clear motivic onset events require a triple group of quarters to precede them in order for those onsets to coincide with points of metric arrival. X.0 is comparatively stable here, as it lacks any such events. X.1 has three “probable” events (D_5 preceding D_7 ; D_7 preceding E_{10} ; E_5 preceding E_{12}), X.2 has two (D'_5 preceding n_4), and the coda one (E_{11} preceding E_{10}). In all six cases, the change enacted by the material that follows the odd-numbered statement is sufficiently distinct so as to all but force a realignment, reducing the periodic zone from whatever depths it had attained under the previously stable regime of the half note to the ever-stable eighth/quarter pair. Note that only motives D and E have the power to effect such changes; all other motives allow the half note to persist undisturbed. This has significant perceptual consequences; a moderately familiar listener may be at some level aware that, hearing any motive (or non-motive) other than D or E begin and unfold, a fair

degree of metric stability is guaranteed—D and E then take on the role of potential threats to the emerging and potentially deep metric hierarchy.⁴⁰

The “possible” reset category includes hemiolic timespans of six quarter notes in which the motivic parallelisms suggest a (33) organization of quarter notes. A parallelistic (33) hearing would disrupt the consistent half-note pulse. On the other hand, these spans of six also enable the listener to shift the triple relation up a level and hear the group as (222), doing some minimal violence to the motivic parallelism in the process. There are four instances of these potential half-note reset points across the movement: one in X.0 (n_3n_3) and three in the “transformational” portion of X.2 ($(D'_3D'_3)$, F_6 (clearly grouped (33)), ($n_3F'_3$)). Clearly, these hemiolic potential upsets to the half note are associated with transformational energy. The structure is foreshadowed alongside “none” statements in the introductory X.0, and returns in the “transformational” subsection of X.2 alongside D' altered form of D and the borderline motive F, along with its altered form F' , which is itself paired with another “none.” None of these hemiolic events occur alongside the main motives C or E, nor the unaltered form of D that retains the essential basic shape of that motive. So, in the same way that these liminal motives threaten the preeminence of the main C, D, and E motives established in X.1, the 6-unit statements hint at coordinating with the “probable” events to upend the largely stable half note pulse. Although the (33) structures suggested by the motivic structure will be felt, I find it unlikely that a listener entraining the half-note pulse will fully upend their entrainment pattern and form new triple expectations in response. So, just as C, D, and E reassert priority at the end of X.2 and in the coda, the half note maintains its central position—except where the “probable” events make its presence all but an impossibility.

⁴⁰ Note that I am not including the odd-numbered statements of n_5 (followed by A_2) and A_3 (followed by A_2) in X.0. This is because motive A lacks the clear arrival point shared by motives B-F; its two submotives feel to me to be equally capable of fulfilling the function of motivic arrival. Within this balanced listening approach, then, I am assuming that the listener maintains the half-note pulse throughout this portion of X.0 despite some weak motivic cues to the contrary.

If only five events scattered throughout the movement force the periodic zone down below the level of the half note, there must be significant stretches of half note stability; this stability may afford the stabilization of still slower pulses. Indeed, there are several passages where, under this balanced listening approach, the periodic zone may become quite deep indeed. The first sixteen quarter notes of X.0, in fact—comprising the opening “none” and all of the A material—unite to form a single large stable phrase. These 16-unit spans mark the most stable metric depth achieved in the movement, a depth which occurs at two other points, in the metrically (but not motivically) relatively stable X.2 section. This metrically normative opening creates the expectation for another 16-unit span and, in the process, the formation of a still deeper 32-unit. The listener does not, however, have to wait long to have this expectation denied, for the first of the hemiolic groups occurs immediately after, forcing a triple unit into the hierarchy and reducing the periodic zone down to the half note. As a transition into X.1, the stable pure duple structure of motive B then allows the re-formation of the 4- and 8-unit spans once again. All told, X.0 is quite metrically stable when heard this way, with a consistent half-note pulse throughout and only a single, relatively deep readjustment required.

Section X.1 tells a quite different story. Although motivically stable, and although much longer than X.0 (67 and 30 quarters, respectively) the 16-unit is not achieved here, nor even much hinted at. That initial triple group of X.0 was a promise of what was to come, fulfilled by the triple groups of C that begin X.1. Although we are considering a pure duple-oriented listener here, it’s also possible that a listener would recognize the recurring invariant pattern here and achieve the 18-span, which would contain two triple minimal meters within it ($6 = 2 \times 3$, $18 = 6 \times 3$). Nevertheless, although half notes are constant here, the 4-span emerges inconsistently, preventing the 8-span from coming into being. When the 8-span does arise alongside the D_4D_5 of mm. 13-14, it is extremely weak, experienced only briefly before the extension that expands D_4 into D_5 becomes apparent. In retrospect, the listener recognizes that the final quarter of D_5 was not, in fact, an arrival, and that the 8-span was realized only

provisionally, on the way to the true non-duple 9-span end state. This 8-span-negating D_5 is the most metrically unstable event so far in the movement, bringing the periodic zone down to the quarter-note level for the first time. The following D_7 statement does the same, underscoring the destabilizing role of the D motive. Given the two adjacent odd-numbered statements, a truly inertial listener would be able to maintain a background periodicity of half notes against D_5D_7 , such that the onset of D_7 would occur on a relatively shallower timepoint, out of alignment with the half-note pulse. Yet unlike motive A, the arrival timepoint of D is extremely strong, and rather difficult to hear as anything other than a metric downbeat; therefore this balanced listener will readjust in response to both of these VI 3 meters.

After this brief moment of intense metric difficulty, the third E motive block of X.1 appears and the metric depth is allowed to expand once again, though E_6 prevents the 8-span and the subsequent 8-span is again provisional, understood retrospectively to be a subset of the final 10-span period. This moderately deep intermediary period is ended by the single VI 3 event of the E block, which again squashes the periodic zone down to the quarter level. To conclude the E block and the X.1 section, three statements of E_4 allow the 8-span to recur once more, though as before, in retrospect the 8-span is understood to be only a potentiality, subsumed within the larger 12-span which continues on past the 8-span until motive D reappears to initiate X.2. The 8-span appeared three times in X.0, each instance of which persisted under the weight of hindsight. The 8-span also appears three times in X.1, though each of these is realized only provisionally and corrected upon retrospective reinterpretation. Interestingly, there is a progressive trend in the stability of each of these reinterpretations. The first, within D_5D_7 , is followed by a reduction to the quarter level, marking this 8-span as a true fiction in hindsight. The second, nestled within E_4E_6 , is followed by a reduction to the half note level; and the following the third—the first two E_4 of $E_4E_4E_4$ —the periodic zone is reduced down only slightly to the whole-note level. In these latter two cases—particularly the last—it may be that the 8-span does persist as a stable structure in retrospect, and that the following material stands apart as a new initiated element that is

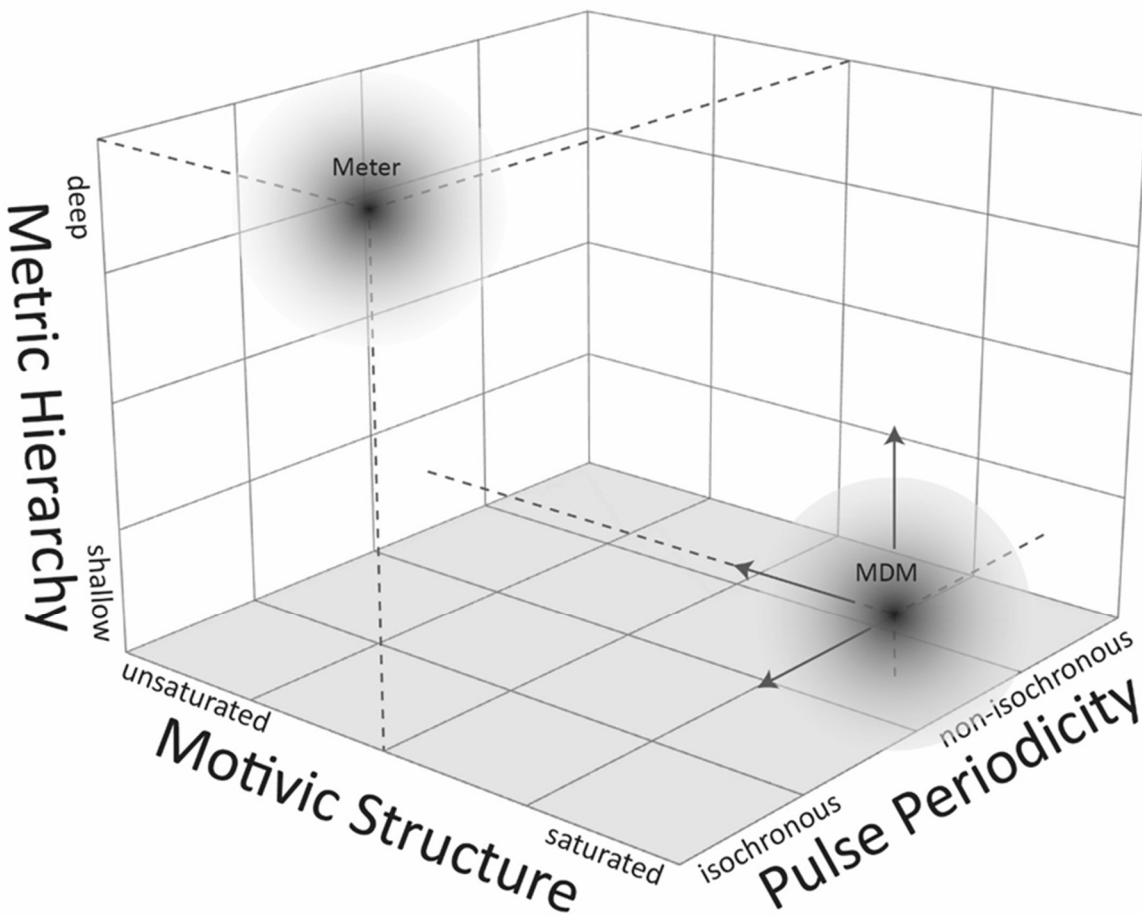
itself truncated. This is particularly plausible in the final set, since the new added span coincides with a motivic onset, E_4 .

As noted above, the motivically complex X.2 section is metrically stable compared to the other sections of this movement. This is especially clear under this balanced listening strategy, as the 16-span is allowed to come into being twice in this section (and nowhere else in the movement). Yet these periods of significant stability are not achieved without effort. X.2 begins with a D block that moves from relatively stable (another temporary 8-span), through a hemiolic block ($D'_3D'_3$) which distorts pure duple, to the D'_5 statement that snaps the periodic zone down to its minimal quarter-note levels. This increasing destabilization coincides with the motivic alteration that comprises the “transformation” subsection, suggesting to the listener initially that these two complications will be correlated. Yet beginning with n_4 , the metric structure stabilizes and projects the second 16-span found in this movement, one which aligns neatly with the motivic structure and suggests no retrospective reinterpretation, making it unambiguously the most stable passage in the piece. The half-note pulse continues after the conclusion of the span, but triple groups enter in to initiate two successive hemiolic sets that disrupt the previously established whole note pulse. The C_6 that follows the hemiolic groups facilitates re-transition to pure duple by maintaining the triple group while removing the sense of conflict produced by the triple grouping of quarters in the previous two 6-spans. This C_6 is unambiguously (222), shifting the triple relation to the slower pulse. The single 8-span motive C_8 initiates the third and final 16-span of the movement, though this metric structure is a significantly weaker echo of the earlier 16-spans for two reasons: first, it will, like the 8-spans of X.1, likely be retrospectively re-interpreted due to the “extra” quarter note at the end of the penultimate motivic statement of the section, D_5 , and will therefore benefit from only provisional realization. Second, the 16-span itself, although metrically plausible in isolation, would require a listener so attached to pure duple that they reset their entire metric hierarchy at any sense of deviation from duple in any pulse—in other

words, this “balanced” listener would have to experience the metric structure notably against the grain of the clear motivic groupings ($F_6n_3F_3$) (C_6C_8) ($D_4D_5D_6$). In total, then, X.2 is describable as a metric stability “arch form,” with peak stability achieved in the central 16-span, bordered by hemiolic groups and various levels of hierarchic flattening.

Comparing this balanced hearing to the purely parallelistic one shown in Example 3.19, we’ve seen what is gained and what is lost under these quite different listening strategies. It should be quite clear at this point why the “Feast” is a much less prototypical example of MDM than the scenes from the *Rite*, as it enables such a broad range of strategies—as did the “Evocation of the Ancestors” example studied in Chapter 2—compared to the more restricted options made available within the *Rite*. Although not explored analytically here, the purely inertial is also much more easily pursued in this example, since the significant depth of the periodic zone and several stable metric spans both suggest it and reward its pursuit. Non-prototypical examples of MDM such as this mark a middleground state within Stravinsky’s approach to metric complexity, between the normative examples already studied and those which clearly produce inertial responses, conforming to Pieter van den Toorn’s type 2 metric configuration.⁴¹ The ways in which the “Feast” pushes away from normative MDM relative to all three definitional features of meter set out in Chapter 1 is illustrated on the Flexible Metric Space as Example 3.20. Pulse periodicity, hierarchic depth, and motivic saturation all trend away from prototypical MDM and toward normative meter. Although I have argued that the more prototypical examples all but force the listener to derive metric information from the motives themselves, it’s clear that less prototypical excerpts such as the “Feast” can accommodate listener preferences of all types, enabling a much more personalized and individual experience than does either “type 1” or “type 2” extreme, allowing the listener a substantial degree of experiential freedom and creativity.

⁴¹ Pieter C. van den Toorn, *The Music of Igor Stravinsky* (New Haven: Yale University Press, 1983), 227.



Example 3.20. The FMS depicting the non-prototypical MDM of the “Feast”

In the next chapter I shift the analytic focus away from Stravinsky to examine a wide range of artists, musical styles, and time periods. All of this material can be compared against this baseline understanding of Stravinsky’s approach to crafting Motive-Directed Meter that has been the focus of this chapter and the last, and which will come into even clearer focus when compared against these more diverse examples. Yet even before considering the strategies of other composers, I will make three initial observations based on the similarities and differences we’ve seen across all of the Stravinsky examples analyzed in Chapters 2 and 3. First, it’s clear that Stravinsky uses MDM in a capacity that is function- and form-neutral. We have seen very brief sections of MDM in otherwise metrically stable contexts (the “Devil’s Dance,” the *Soldier’s Tale*) and in metrically-mixed environments (“Ritual of

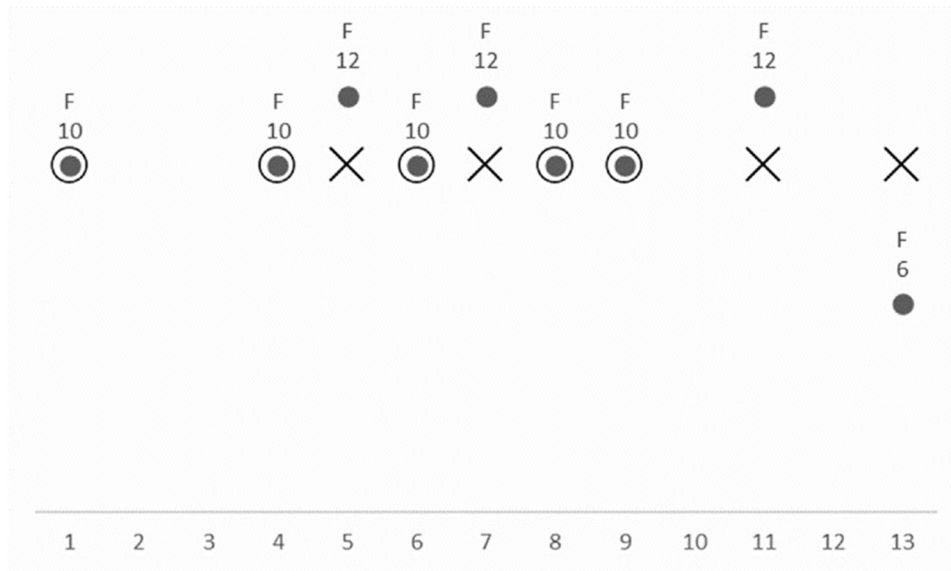
Abduction,” the *Rite of Spring*); in moderately-lengthed MDM sections intermixed with other stable and similarly-sized sections (“Shrovetide Fair,” *Petrushka*); in non-prototypical MDM movements with brief interjections (“The Evocation of the Ancestors,” the *Rite*), and with stable single-section interjections (the “Feast at the Emperor’s Palace,” the *Song of the Nightingale*); and in prototypical, movement-length sections of MDM with and without interspersed non-MDM materials (the *Rite*, the “Sacrificial Dance” and the “Glorification of the Chosen One,” respectively). Although MDM may have specific *affective* connotations, such concerns have not been the focus of the analysis here. From a formal perspective, it’s clear that MDM organization is capable of opening and closing movements, and of existing in isolation as well as alongside other, more normatively metric materials.

Second, we have seen that Motive-Directed Meter is not a monolithic phenomenon in Stravinsky’s hands, but, as was depicted in the various FMS depictions from this chapter and the last, it can be—and here is—like meter itself, a broad category affording a range of experiences and types of organization. For the purposes of exemplifying the phenomenon at its extreme, many of the examples I selected for study here were among the most prototypical of Stravinsky’s output—in truth, the composer has many more examples of non-prototypical cases, such as those of the “Evocation” and the “Feast,” as well as many tending even further towards van den Toorn’s non-MDM “type 2” experience. As suggested above, those works at the extreme poles are the most restrictive, while the non-prototypical cases enable flexibility and freedom; it is this central condition of experiential freedom that is most often supported by Stravinsky’s metrically complex output. Yet even within the works I’ve labeled “prototypical” examples of MDM, there is a great range of stability and of organizational approach—consider, as a clear example, the various sections of the “Glorification of the Chosen One,” which feature significant changes of motivic material and metric stability, all the while keeping the listener dependent upon motivic information for the formation of metric predictions.

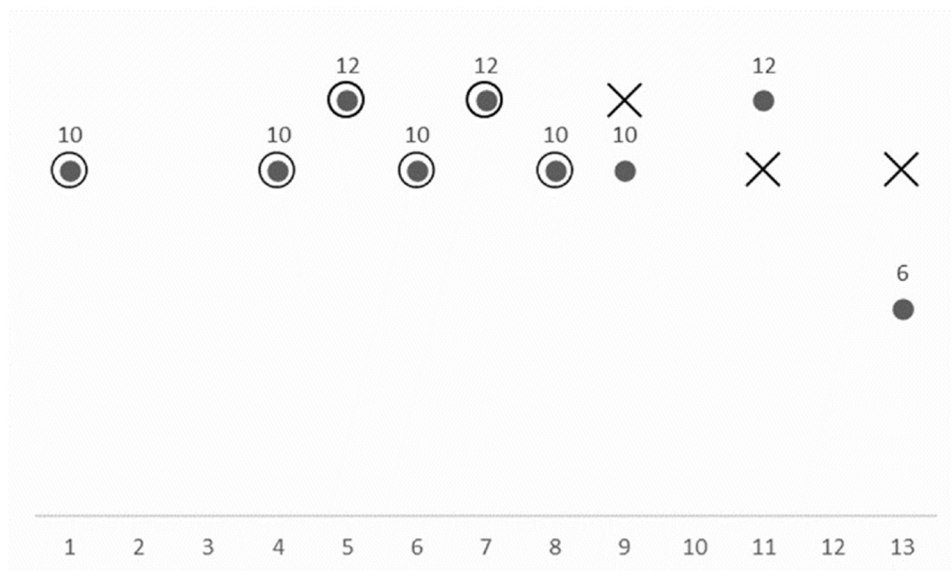
Third and finally, although this project is not concerned with composer intentionality, it's quite clear that the resultant effect of the metric/motivic organization in these works is a continued, lasting predictive difficulty that is likely to be only very gradually ameliorated by repeated listenings. One can certainly imagine a metric/motivic structure that produced an MDM experience upon first hearing and with minimal familiarity, but which in fact possessed higher periodicities and recurrences which would come into focus and enable successful metric prediction, given sufficient familiarity—indeed, we will see such phenomena in the next chapter. Yet Stravinsky's Motive-Directed Meter is decidedly non-periodic at every level above the tactus. Beyond the initial first-time listening experience, each new learned component of the metric/motivic design, though it may provide some predictive advantages, may in turn produce new problems as metric inconsistencies are seen in a new predictive context. We have seen how predictive abilities improve, in general, as a listener progresses from local inertia, through motivic inertia, to the prototype expectation stage. But even at this last stage, many unpredictable moments remain. Future research may wish to explore how listeners grapple with the irregularities of specific non-prototype statements that require rote memorization, as discussed in Chapter 2.⁴² As an example of what this work might look like, let's return to take one quick final look at a passage from the "Glorification of the Chosen One," analyzed above in Part II.

Example 3.21 presents a selection of the motive map for the "Glorification," first presented as Example 3.15a, showing all of the motive F statements from section Y.2 and the end of Y.1. Intervening statements are represented with blank spaces. This example presents a series of five learning "stages" that represent a hypothetical progression of rote learning as a theoretical listener becomes increasingly familiar with the sequence of motive statements through repeated listenings. In stage 1 (Example 3.21a), the Prototype method itself is shown, in which this listener expects the most frequent F_{10} form at every motive F instance; four statements are inaccurately predicted. In stage 2 (Example 3.21b), the

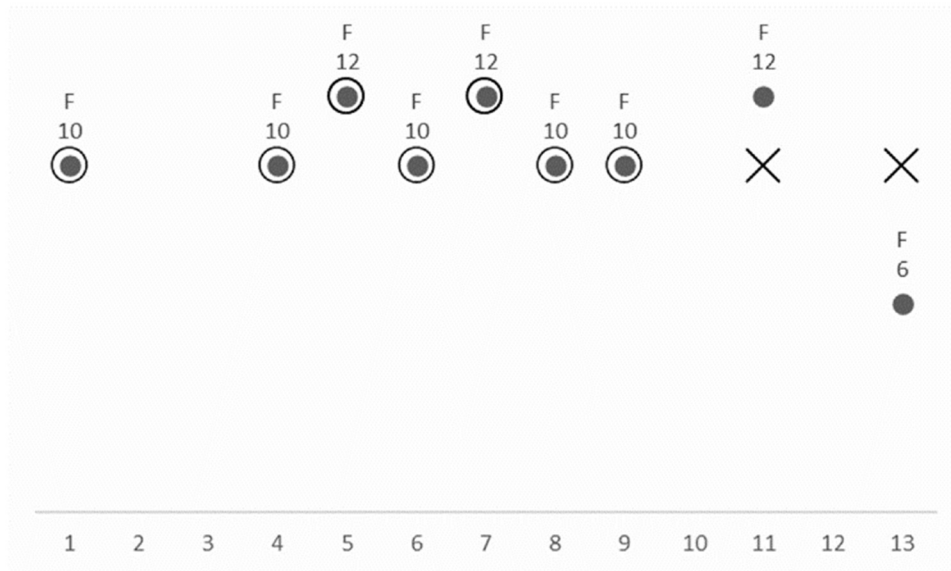
⁴² See Chapter 2, Part III.



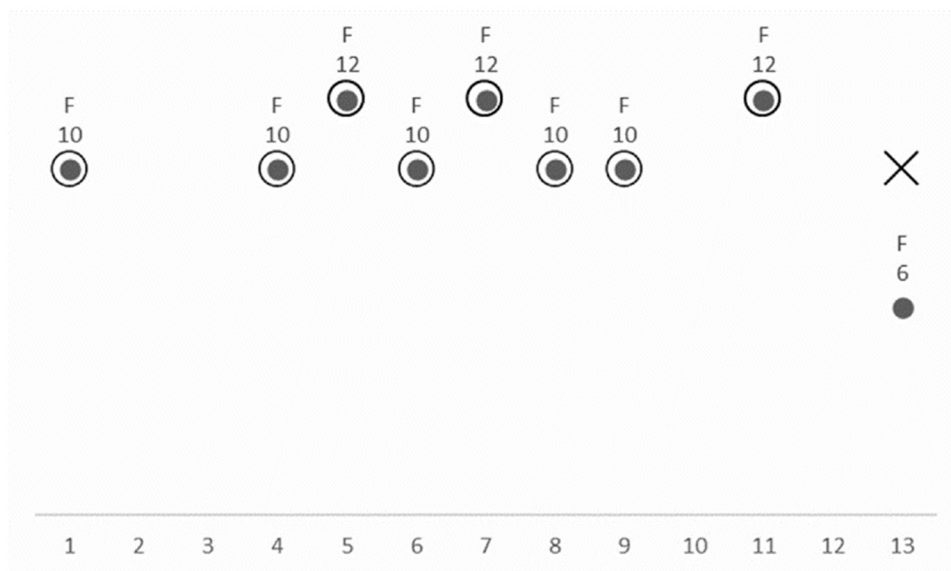
Example 3.21a. The hypothetical "stages of memorization" for the F motive in the "Glorification of the Chosen One," stage 1 (prototype approach)



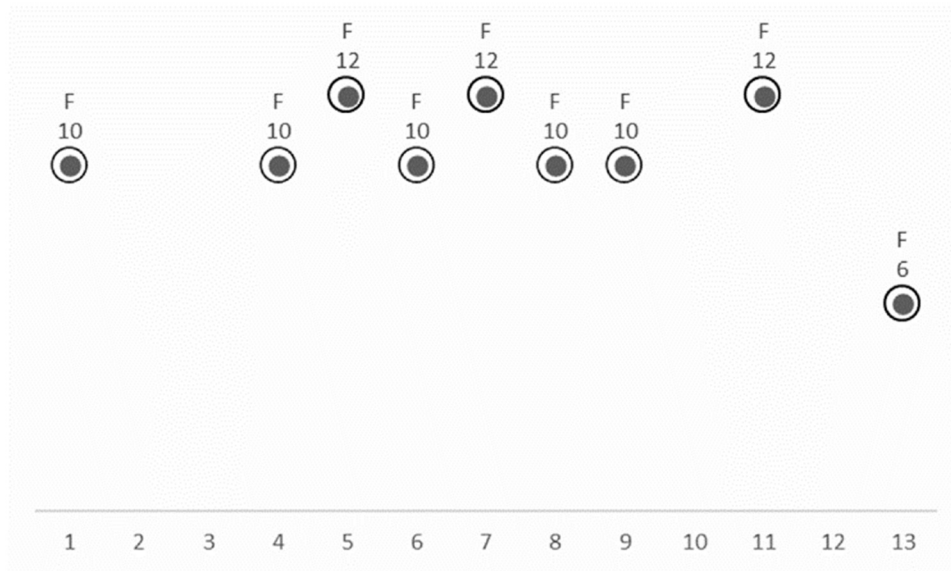
Example 3.21b. The hypothetical "stages of memorization" for the F motive in the "Glorification of the Chosen One," stage 2



Example 3.21c. The hypothetical "stages of memorization" for the F motive in the "Glorification of the Chosen One," stage 3



Example 3.21d. The hypothetical "stages of memorization" for the F motive in the "Glorification of the Chosen One," stage 4



Example 3.21e. The hypothetical “stages of memorization” for the F motive in the “Glorification of the Chosen One,” stage 5 (learned)

listener has recognized the $F_{10}F_{12}$ pairs that appear together and predicts the pair throughout the connected section of 6 F statements. Note, however, that stage 2 actually features one *decrease* in predictive accuracy: whereas stage 1 correctly predicted the final prototype form F_{10} of the 6-set, in stage 2, this listener has projected the $F_{10}F_{12}$ pair one too many times. This over-projection is corrected in stage 3 (Example 3.21c), where the listener has learned that the pair appears only twice in succession. Finally, in stages 4 and 5, depicted in Example 3.21d and 3.21e, respectively, this listener learns the lengths of the final two disconnected F statements, F_{12} and F_6 . I think it likely that the F_{12} will be learned first in stage 4, since this is a “known” form which the listener has, at this point, already correctly predicted several times; furthermore, this F_{12} might be heard as a late appearance of the F_{12} that was expected at the end of the 6-set in stage 2. Finally, in stage 5, this listener learns the length of the final truncated F_6 . As this is the only appearance of this particular form, the listener has fewer opportunities to become familiar with it.

Example 3.21 presents a plausible sequence of steps in which a listener may gradually come to memorize the behavior of motive F and successfully predict its varied spans. Although reasonable, it is

ultimately based on vague determinations of plausibility; the next analytic step would be to formalize the process of memorization according to a set of rules similar to the “Prototype Preference Rules” introduced in Chapter 2.⁴³ Using this type of systematized approach, one could fully explore how pieces of Motive-Directed Meter become learned in the course of repeated listenings. I leave this work to future scholars; we now instead leave the realm of Stravinsky’s MDM to explore, in Chapter 4, how the phenomenon manifests in the late twentieth and early twenty-first century.

⁴³ See Chapter 2, Part III.

In the immediate aftermath of Stravinsky's metrically complex Russian Period works, several prominent composers took notice. After the First World War, Béla Bartók was well aware of some of Stravinsky's more challenging pieces, including the *Rite of Spring* and the *Nightingale*, and commented that such works made a distinct impression upon him.¹ Bartók's enduring fascination with Hungarian and Romanian folk musics was a major source of rhythmic inspiration, but the specific flavor of Stravinsky's direct influence is distinctly observable in the quite prototypical examples of Motive-Directed Meter scattered across many compositions of the Twenties, including the *Dance Suite* (1923) and "Unison" from *Mikrokosmos*, as well as several passages from the third and fourth String Quartets (1927 and 1928, respectively).² Indeed, Bartók was attending closely to Stravinsky's compositional output until at least 1924, and while there were substantial aesthetic differences between the two composers—particularly as Stravinsky developed his "neoclassical" style—lines of technical musical influence remain clear throughout this period.³ Prominent critic Aladár Tóth summarized this technical and stylistic tension in his 1928 commentary on Bartók's First Piano Concerto:

¹ David E. Schneider, "Bartók and Stravinsky: Respect, Competition, Influence, and the Hungarian Reaction to Modernism in the 1920s," in *Bartók and His World*, ed. Peter Laki (Princeton, NJ: Princeton University Press, 1995), 178.

² Daphne Leong has explored Bartók's rhythmic language and its relationship to folk music in several publications, such as Daphne Leong, "Bartók's Studies of Folk Rhythm: A Window into His Own Practice," *Acta Musicologica* 76, no. 2 (2004). See also Daphne Leong, *Performing Knowledge: Twentieth-Century Music in Analysis and Performance* (New York, NY: Oxford University Press, 2019), 97-132. John Roeder has also analyzed Bartók's rhythms using his "pulse stream" technology: John Roeder, "Bartók's Grooves: Metrical Processes in the Fourth String Quartet," in *The String Quartets of Béla Bartók: Tradition and Legacy in Analytical Perspective*, ed. Dániel Péter Biró and Harald Krebs (New York: Oxford University Press, 2014).

³ Schneider, "Bartók and Stravinsky: Respect, Competition, Influence, and the Hungarian Reaction to Modernism in the 1920s," 173. For a more detailed exploration of the sometimes-tense relationship between these composers, see *Bartók, Hungary, and the Renewal of Tradition: Case Studies in the Intersection of Modernity and Nationality* (Berkeley: University of California Press, 2006), 119-83.

We know well the power of barbaric, wild rhythms, for here among us lives well the greatest master of them: Béla Bartók. But Stravinsky's rhythm is something entirely different: it resembles Bartók's only in its demonic verve. Bartók's rhythm is always deeply poetic...Bartók soars when he plays the piano, Stravinsky remains earthbound.⁴

In France, Stravinsky's metrical techniques exerted a profound influence on Olivier Messiaen, who analyzed the *Rite of Spring* as early as 1930 and later wrote about its metric structure in his *Technique of My Musical Language*, published in 1944, shortly after becoming professor of harmony at the Paris Conservatoire in 1941.⁵ In this position he would influence generations of composers with classes in which the rhythms of the *Rite* would take center stage. The MDM-rich "Glorification of the Chosen One" and "Sacrificial Dance," analyzed in Chapter 3, were central to his understanding of Stravinsky's rhythm, as they exemplified the "Rhythmic Characters" technique that Messiaen would go on to exploit in his own writing.⁶ Throughout his career, many of his compositions contain significant passages of Motive-Directed Meter, from the early "Dance of Fury for the Seven Trumpets" from the *Quartet for the End of Time* (1941) and *Cinq rechants* (1948) through to the *From the Canyons to the Stars...* (1971), especially XI: "Omao, leiothrix, 'elepaio, shama," and several movements from *Illuminations of the Beyond* (1991), his final completed composition.

As these brief examples make clear, a full historical accounting of the development of Motive-Directed Meter through the twentieth century would be a significant undertaking, one which would require the extensive tracing of lines of influence, as well as detailed study of the works of many composers. This final chapter undertakes a somewhat more modest goal. Whereas this metric phenomenon was once closely associated with Stravinsky, this is no longer the case, particularly once

⁴ Quoted in "Bartók and Stravinsky: Respect, Competition, Influence, and the Hungarian Reaction to Modernism in the 1920s," 183-84.

⁵ Vincent P. Benitez, "Stravinsky and the End of Musical Time: Messiaen's Analysis of *the Rite* and Its Impact on Twentieth-Century Music," in *Sacre Celebration: Revisiting, Reflecting, Revisioning* (York University, Toronto, 2013), 1.

⁶ *Ibid.*, 2.

one moves beyond the confines of exclusive art music circles. Indeed, MDM is used today by countless musicians from an extremely diverse range of stylistic and cultural backgrounds. While some metrically experimental current art music composers may trace their lineage to Stravinsky, many pop artists do not; these techniques have, in other words, become common currency, divorced from the figure who helped to popularize them in circles of modernist composition.

Acknowledging the proliferation and generalization of MDM techniques across the twentieth century—without chronicling the particular historical details of that development—this chapter undertakes a survey of current and recent trends in this metric phenomenon across a wide swath of musical genres. This overview is not intended to be comprehensive; indeed, MDM is so widespread today that a full accounting of its manifestations would be impossible. Rather, this chapter seeks to paint a picture of the diversity of uses to which MDM is put today. This chapter is in many ways the antithetical counterpart to Chapter 3, which focused in minute detail on three compositions written by a single composer. This chapter will emphasize breadth rather than depth, discussing a large number of pieces and the broader trends in which they participate. Due to the large number of excerpts covered here, these analyses will be somewhat less detailed, and some of the more technical analytical tools used in chapters 2 and 3 will not return here. The chapter is divided into two parts. In Part I, I look briefly at the work of three art music composers whose metric experiments have produced several works that are prototypical examples of Motive-Directed Meter. Then, in Part II, I turn to trends in recent popular music, and reveal a number of techniques used to work MDM into both traditional and non-traditional song forms. With hope, this overview will spark interest in this underexplored phenomenon and spur further exploration in greater detail than is possible here.

There is yet another way in which this chapter is the antithesis of preceding materials. Chapters 2 and 3 focused on the work of a single individual, Igor Stravinsky, who already looms very large in western music history, particularly that of twentieth-century modernism. By placing such emphasis on

his work, the previous two chapters have inevitably participated in, and thereby reinforced, the longstanding and ongoing suppression of minority voices in music scholarship. Although my focus has been on the *perception* of Stravinsky's works, rather than on abstract structures themselves, these two pursuits are inextricably intertwined; by placing such emphasis on these pieces, I have necessarily contributed to their continued reification, and thereby, to the veneration of the white male individual who produced them. In hopes of counterbalancing this state of affairs, the broad scope of the present chapter will be used to survey the work of lesser-known artists and of representatives of minority groups. As such, the subject matter of this chapter will exclusively be the work of female artists and of persons of color, groups that have been consistently marginalized within music academia. With hope, this chapter will demonstrate that Motive-Directed Meter is not the sole purview of the white male composer with whom it is often associated, but a common currency in diverse stylistic and cultural contexts. Furthermore, the combination of these diverse voices adds a depth and richness to the present chapter, which will be readily evident by the great variety of techniques explored here.

I. MOTIVE-DIRECTED METER IN RECENT COMPOSITION

The fourth movement of Vivian Fine's 1978 *Quartet for Brass* is "constantly dancing," writes Heidi Von Gunden in the liner notes that accompany the 1995 recording. "Material is reused as canons, retrogrades, and in augmentation, but the energy never ceases, and the listener does not have time to register the compositional manipulations."⁷ Marked "Lively (♩=144, ♪.=96)," the movement is a near-constant flurry of sixteenth notes, the flow of which pauses only in mm. 28-39. The compositional techniques described by Von Gunden are summarized in the form chart of Example 4.1, and indeed, many of them do pass by far too quickly to register; others, such as the select pitches converted to rests

⁷ Heidi Von Gunden, *Music of Vivian Fine* (Composers Recordings Inc. (CRI), 1995), Compact disc. Liner notes., CD 692.

in Variation 1, are much more perceptible. Yet neither the manipulations nor the variation numbers themselves are indicated on the score, a document which therefore acts as a kind of puzzle that the interested performer is invited to parse themselves. This is curious given Fine's interest in the performer's experience of her music. In an interview with Bruce Duffie, Fine suggested that she doesn't think about the public when she is writing, but the musicians. "I write for the performers," she noted—that is, for the specific musicians who will be premiering the work.⁸ In this case, the *Quartet for Brass* was commissioned by the Metropolitan Brass Quartet, who, lacking instructions, were left to search for the variation boundaries and the variation techniques that characterize them.

Measures	Section	Technique(s)
1-7	Theme	
8-14	Var 1	Substitution of rests for certain pitches
15-21	Var 2	Canon
21-27	Var 3	Retrograde
28-41	Var 4	Textual reduction; augmentation
42-45	Var 5	Removal of rests from Var 1
46-52	Var 6	Retrograde inversion
53-59	Theme	

Example 4.1. The form of Fine's Quartet for Brass: IV. Variations

If, as Von Gunden notes, the techniques pile up too quickly for the listener to follow, the metric changes of the work are no different. The main Theme that appears at the opening and close of the movement is metrically complex, featuring frequent changes, as evident in the reduction of Example 4.2. The brief passage is quite difficult, as each motivic statement presents a different span than that which precedes it, except for the final repetition of the 5-unit (32) that produces increased stability at the section's closing. This (32) is the most frequent span, appearing once at the end of subphrases (systems in Example 4.2) one and two, and twice at the end of subphrase three.

⁸ Bruce Duffie and Vivian Fine, "Composer Vivian Fine: A Conversation with Bruce Duffie," <http://www.bruceduffie.com/fine.html>.



Example 4.2. A reduction of the theme of IV. Variations (Fine, 1985)

Furthermore, the motivic material is extremely similar across all of these (32) statements. On the other hand, the first bar of each subphrase is much more varied, in terms of melodic content as well as metric structure. Note the decreasing length of these statements—(8, 6, 4)—each of which contain only duple relations to the sixteenth-note pulse. Or do they? Duple bias predisposes the listener to hear the opening (332) bar relative to an underlying (2222) structure, but the (32) second measure encourages a

re-evaluation—perhaps the (32) is an important structure after all. Measure 3 is also ambiguous, for although the final (2) group forces the bar into a (222) intermediate pulse, the accents and phrasing clearly present a surface of (42), which will allow the listener to temporarily entertain a triple grouping for the first several of the bar’s onsets. Despite these hidden processes, this Theme is an unambiguous example of prototypical Motive-Directed Meter. The already-clear metric groupings of the first trumpet’s main theme are reinforced by the accents in the accompanying instruments, all but forcing a parallelistic listening strategy. Uniquely, relative to the MDM we’ve examined so far, the metric complexity here becomes the source material to be transformed in the variations.

Variation 1 is notated with the same meter signatures as the theme, though now the first onset event of each group of sixteenth notes is replaced with a sixteenth rest, as shown in Example 4.3. The removal of articulations from these important timepoints interferes with their ability to evoke significant metric depth, which might result in a listener feeling groups shifted forward by one sixteenth to the first onset event of each group. As Example 4.3 shows, this delays the metric hierarchy,

The image displays three staves of musical notation for Variation 1. The first staff begins with a tempo marking of ♩ = 88. Above the staff, two brackets indicate metric groupings of 8 and 5 measures. The second staff also has brackets for 6 and 5 measures. The third staff features three brackets for 4, 5, and 4 measures. The notation includes sixteenth notes, rests, and accents, with some notes beamed together. The key signature has one flat (B-flat).

Example 4.3. A reduction of Variation 1 from IV. Variations (Fine, 1985)

but does not ultimately alter it. More familiar listeners will, however, have come to more closely associate the melodic structure of the Theme with specific metric experiences—recall that listeners hear the Theme twice each time through the piece, but each variation only once. It's therefore possible that familiar listeners might retain metric information from the Theme and associate it with specific pitch events in Variation 1, feeling deep metric events in their original locations despite the absence of pitch onsets.

More interesting still is Variation 5, which further develops upon the innovations of Variation 1 by removing those rest-converted events entirely. As a result, Variation 5 is significantly shorter than the theme or Variation 1. Whereas the shift from notes to rests in Variation 1 led to two options, each of which preserved the metric structure of the Theme (either displaced or not displaced), the complete removal of these events can only transform the felt metric structure in significant ways, as shown in the reduction of Example 4.4. Although the 5-unit is common to both the theme and variation 5, they



Example 4.4. A reduction of Variation 5 from IV. Variations (Fine, 1985)

feature exclusively contrasting intermediate pulses: (32) and (23), respectively. As a result, no metric structure is shared in common between the theme and variation 5, despite the obviously similar melodic materials of the sections. But more than this, the sections offer quite different metric experiences. The Theme balances out the more difficult meters of variability index (VI) 4 with those of VI 1 and 2; Variation 5 offers no such amelioration, but maintains a consistent VI 4 throughout.⁹ Furthermore, the

⁹ The variability index was introduced in Chapter 2, Part I. It ranks meters according to their entrainment difficulty with numbers 1-4; lower numbers are in general easier to entrain.

flow of metric relations is fundamentally different. The Theme begins with a series of statements that are connected by no metric relation whatsoever, but the second half of the Theme smooths out, with two statements connected by Beat cardinality (B) and the final pair of Identical (I) 5-units. Just as the sections share no metric structures in common, neither do they share any metric relations: only the Ordered subset/superset (O) and Unordered subset/superset (U) relations are present here. And while the Theme showed a gradual stabilization of relations from n to B to I, in Variation 5 we find the opposite, with the final U relation the weakest of all. Variations 1 and 5 highlight how meter itself is a subject of variation in this movement, in which an already complex theme becomes continually transformed, creating a series of novel metric experiences.

If Fine's *Quartet* is an example of Motive-Directed Meter in miniature, Julia Wolfe provides us with MDM on an unprecedented scale in her 1995 string quartet *Dig Deep*. The work was commissioned by the Kronos Quartet and recorded in 2003 by ETHEL; the first nine and a half minutes of this 14-minute track consist of alternation between block chord passages of MDM and brief interjections of a rhythmically freer character. The MDM units are marked "dig deep," while the freer interjections feature a number of descriptions, such as "sing" and "fight it out." The "dig deep" MDM sections foreground a fundamental tension between sets of dotted eighth notes and quarter notes; the first several alternations are presented here as Example 4.5. We can consider each group to be a kind of unidimensional rhythmic motive, with groups of three and four sixteenths simply named "shorts" and "longs," respectively. In every piece of MDM we have analyzed so far, the short and long values were represented by duple and triple, respectively. The shift to triple and quadruple will result in a markedly different listening experience, as describe in more detail below.¹⁰ The battle between triple shorts and

¹⁰ The non-isochronous pulse comprising "triple" and "quadruple" still conforms to London's requirements that non-isochronous pluses be made up of "shorts" and "longs," in which "shorts" are

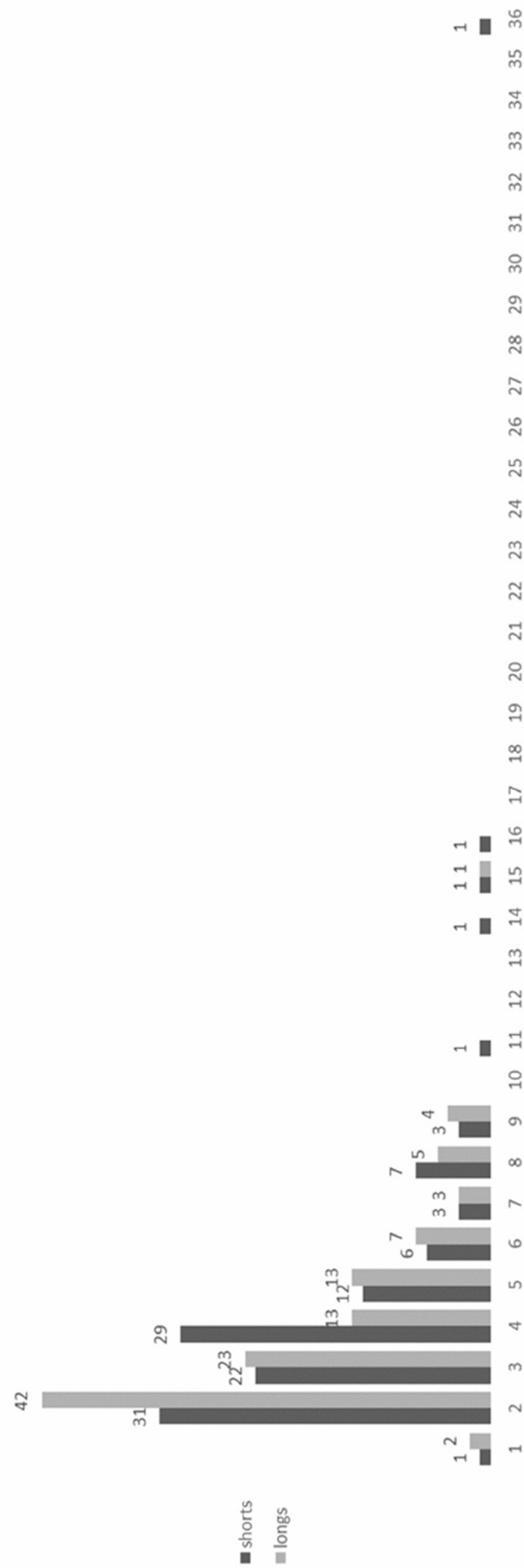
quadruple longs plays out in numerous “dig deep” sections across the work, each of which features a wide range of statement lengths. The end-state distribution of each motive is given as Example 4.6, which presents counts of triple and quadruple groups rather than of the unit pulse itself. The distribution of shorts and longs is similar overall; the average length of a statement of shorts is 4.5 onset events, while statements of longs average 3.8 onsets.¹¹

The image displays three staves of musical notation, each representing a different rhythmic grouping of the opening of Wolfe's *Dig Deep*. The first staff is labeled 'shorts2' and 'longs8' and includes a tempo marking of quarter note = 158. The second staff is labeled 'shorts3' and 'longs4'. The third staff is labeled 'shorts2' and 'longs9'. Each staff shows a sequence of notes with stems and beams, representing the rhythmic structure of the music.

Example 4.5. A re-barred reduction of the opening of Wolfe's *Dig Deep* (Wolfe, 1995)

greater than half the span of “longs.” Justin London, *Hearing in Time: Psychological Aspects of Musical Meter*, 2nd ed. (New York; Oxford: Oxford University Press, 2012), 128.

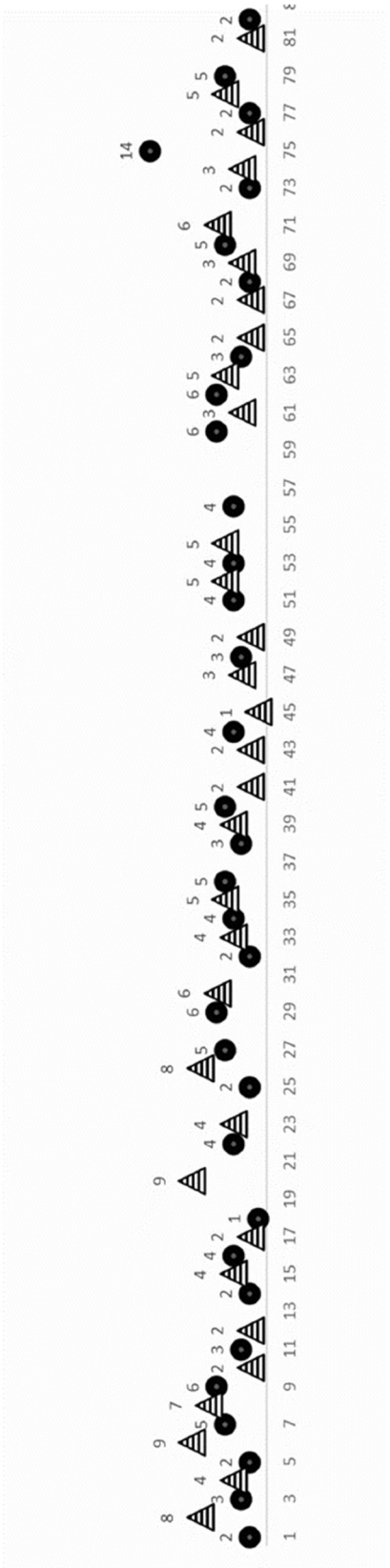
¹¹ Counted relative to the underlying sixteenth note unit pulse, statements of “shorts” average 13.5 units, and “longs” 15 units.



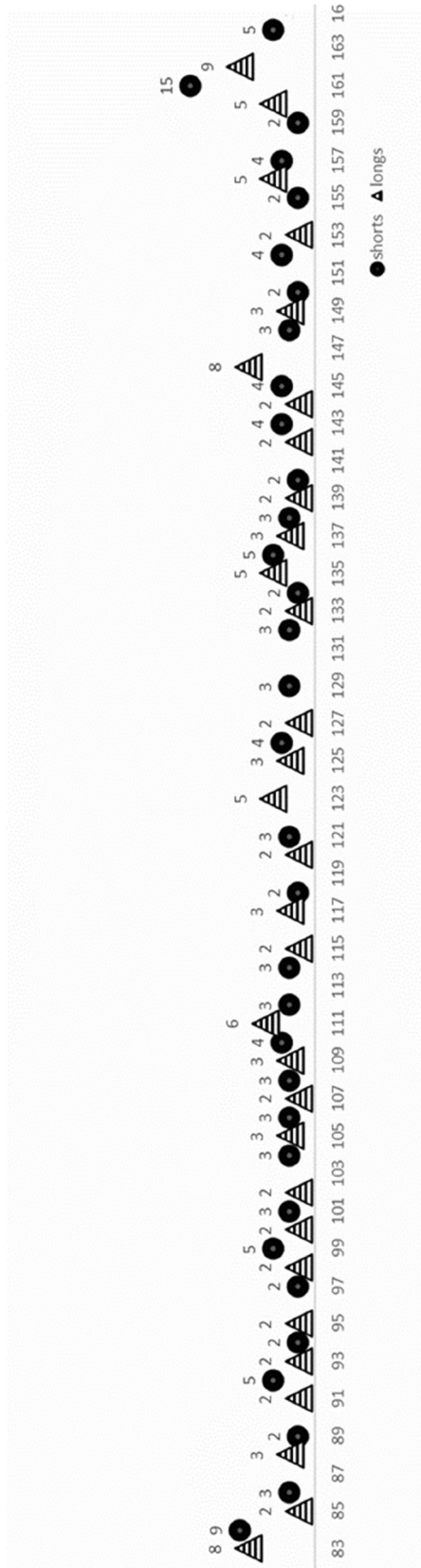
Example 4.6. The distribution of motive forms in Dig Deep

A motive map of all dig deep sections is given as Example 4.7. This map shows only the struggle between “shorts” and “longs;” all of the intervening sections, which range from 6 to 296 sixteenths in length, are represented as blank spaces in the graph. Note in particular the extreme variability of motive lengths. Whereas the large MDM movements studied in Chapter 3 all featured recurring hypermetric and/or supermotivic patterns, *Dig Deep* is supremely unpredictable; only the mostly regular alternation between shorts and longs is evident. In my position as analyst, surveying the work from an atemporal position, I still struggle to find higher-level metric patterning; how much more unlikely is it then that a listener would correctly identify and predict such patterns in the course of the realtime listening experience? In Chapters 2 and 3 we observed that Stravinsky’s MDM often begins by setting up metrically normative patterns, which are subsequently transformed in varied repetitions, resulting in the experience of Motive-Directed Meter. In *Dig Deep*, such expectations never get a chance to emerge. It seems likely that something like a prototype (P) expectational approach can never arise in the face of such unrelenting change; yet shorts and longs are so starkly differentiated that no listener could possibly confuse them, and as such, a local inertia (L) approach seems out of the question. Rather, I think a listener is likely to gravitate to something like consistent motivic inertia (M) throughout, always comparing each statement of shorts or longs to the most recent statement of shorts or longs, respectively.¹² Let’s consider what that might look like.

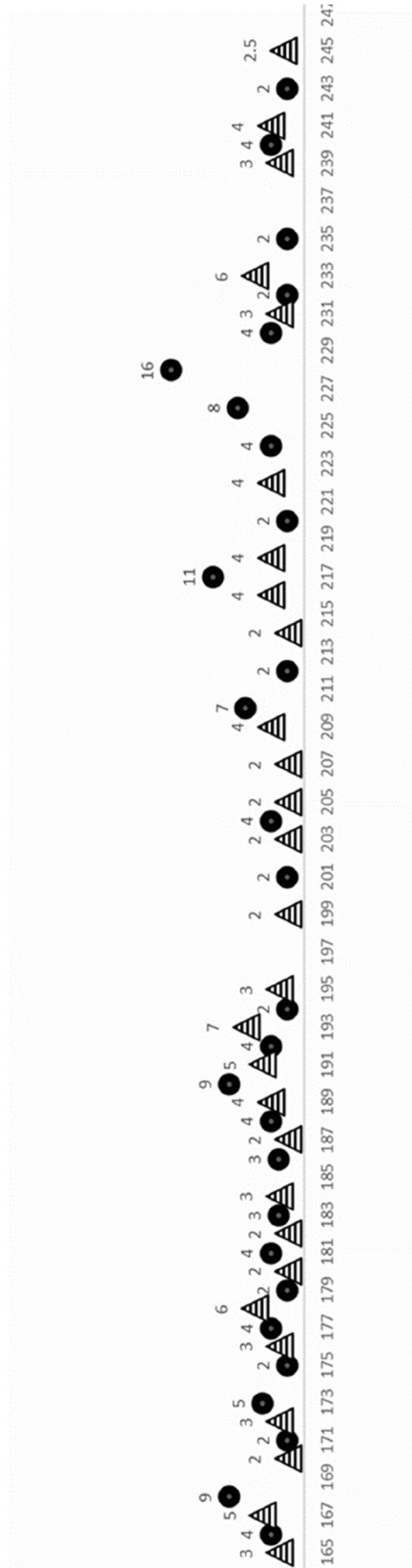
¹² These three semi-automatic expectation-generation methods were introduced in Chapter 2, parts II and III. Following “local inertia,” a listener expects the current statement to replicate the metric profile of the most recently-completed statement. Following “motivic Inertia,” a listener expects the current statement to replicate the metric profile of the most recently-completed statement *of that specific motive*. Following a “prototype” approach, a listener expects each statement of a particular motive to conform to the prototype form of that motive, as determined by the Prototype Preference Rules introduced in Chapter 2, Part III.

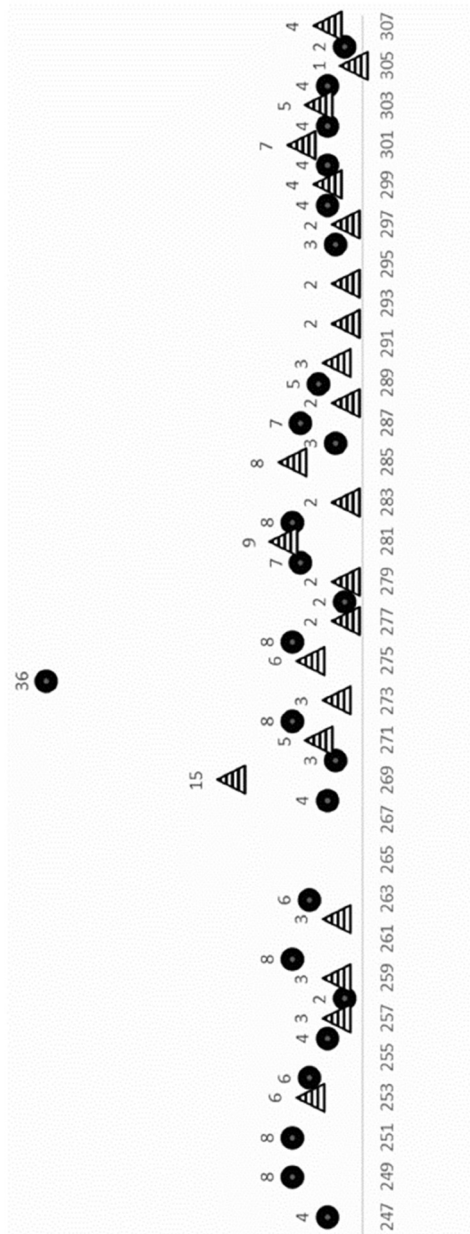


Example 4.7. A motive map of Dig Deep



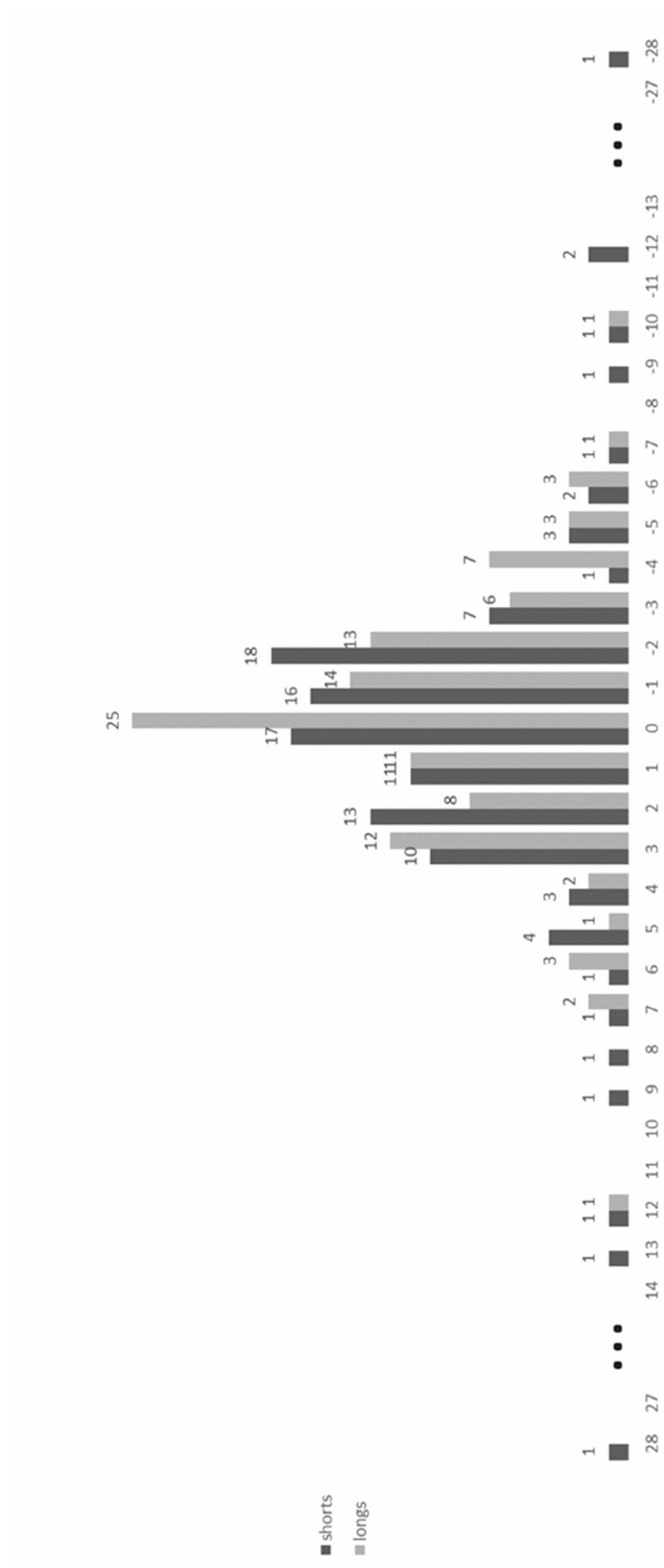
Example 4.7. A motive map of Dig Deep (continued)





Example 4.7. A motive map of Dig Deep (continued)

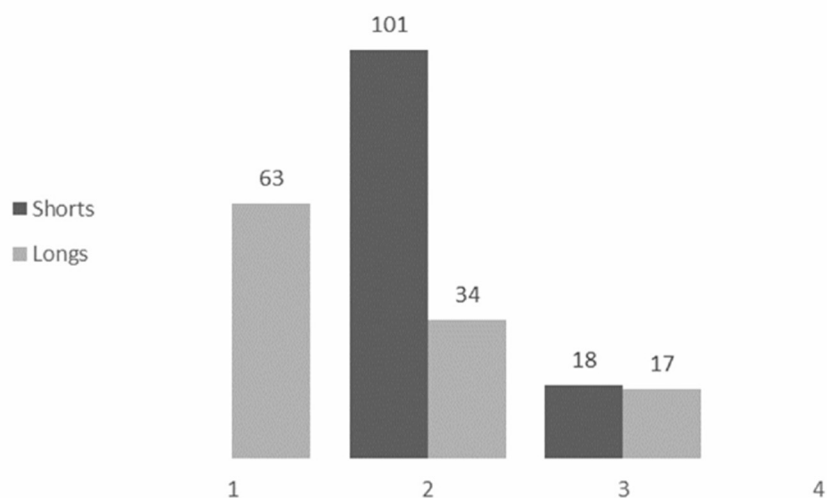
Whereas Example 4.6 shows the distribution of motive forms for “shorts” and “longs,” Example 4.8 shows the distribution of changes of statement length for successive statements of the same motive. In other words, looking at the center of the graph, we see that, out of 118 statements of longs, 25 featured a change of 0 onset events—that is, they replicated the same form as the previous statement. This example gives us some idea of the degree of fluctuation a listener will experience when following



Example 4.8. The distribution of size (onset events) difference between successive statements of the same motive in Dig Deep

something like motivic inertia. Longs seem to behave in a more stable way than “shorts,” both because they lack the extreme shifts at the edges of Example 4.8, and because they much more frequently feature no change between successive statements. Indeed, changes between statements of “longs” average |2.3| onsets, while statements of “shorts” average |3.1| onsets. Just as duple is generally more stable than triple, so too are the duple-based “longs” the agents of stability against the more variable triple “shorts,” if only slightly so. This is a change to the usual structure of MDM, made up of duple short units and triple long units, in which the shorter units are typically the more stable.

The exclusive presence of triple groups in the shorts motive and duple in the longs drastically reduces the kinds of metric relations that can hold between successive statements. Indeed, only Beat cardinality (B) and Pulse periodicity (P) are possible, though they are rather uncommon. Out of 168 connections between successive statements—that is, not counting any connections interrupted by intervening non-MDM materials—77% (129) feature no metric relation whatsoever, while 18% (31) feature B, and 5% (8) feature P. In the case of *Dig Deep*, B also describes the number of onset events in adjacent motives; only about one-fifth of the time do successive statements share this connection, which is likely to be much more readily perceptible here than P, which may be masked by the quite different character of all-triple shorts and all-quadruple longs. On the other hand, these duration-exclusive statements also limit what categories of meter are possible; in particular, meters of the maximally-difficult variability index (VI) 4 cannot arise, since spans of 2 and 3 cannot intermix in the intermediate pulse within the same motive statement. This reduces the entrainment difficulty of the piece overall. Furthermore, the maximally stable VI 1 is only possible in the longs, as shown in Example 4.9. Both statements present a similar number of the rather more difficult VI 3, but longs are frequently “pure duple.” This is yet another way in which longs act as the relatively stable pole in this continual back-and-forth. All told, *Dig Deep* is remarkable not only for the impressive scale of its MDM, but also



Example 4.9. The distribution of VI values in Dig Deep

for an extreme, seemingly pattern-free unpredictability that utilizes durational spans in ways we’ve not yet seen.

The metric structures of Fine’s *Quartet for Brass* and Wolfe’s *Dig Deep* are carefully specified to performers in meticulously notated musical scores. While we cannot be sure of Wolfe’s compositional process, and the extent to which the explicit denial of expectation formation was a conscious compositional goal, it seems clear that Fine must have chosen her metric structures quite carefully, with an eye towards the metric affordances of those durational patterns under the specific variational techniques she would use. Meredith Monk, the third and final composer we’ll consider in Part I of this chapter, takes a very different approach to composition. We observed above that Vivian Fine composed with specific performers in mind; Monk, on the other hand, composes in collaboration with her performers, workshopping prepared fragments of pieces in dialogue with the technical abilities and improvisational ideas of her musicians. Monk’s unique relationship with musical notation further differentiates her from all of the composers considered so far. Oftentimes eschewing traditional

Western notation—and, in many cases, notation altogether—Monk frequently relies upon alternate memory aids, such as the tape recorder. Indeed, at least two of the four pieces we'll examine here were never notated; as such, I will rely on my own transcriptions in the analyses that follow.¹³

The first example of Motive-Directed Meter in Monk's output is an outlier relative to Monk's dialogic compositional process, as it requires no performer—a rarity in her work, which typically features vocalists, often singing wordlessly. The piece is *Engine Steps*, a two-minute track off of her 1983 album *Turtle Dreams*. For reviewer Tyran Grillo, in this piece, "timed silence breeds an unusual industrial rhythm, like a conveyor belt carrying things to be stamped and shipped out into the universe."¹⁴ Indeed, this brief tape collage seems to depict an engine chugging along in slightly off-kilter rhythms, interspersed with irregularly-spaced "backfiring" that produces unpredictable groupings of the repetitive rhythms. To my ear, the dynamic accents produced by these backfires are clear onset events that produce higher-level metric groupings; each group is furthermore divided into two motives by the mid-group shift to full quarter notes. A shorthand transcription of the first five statements is presented in Example 4.10. A full motive map is provided as Example 4.11, and an end-state distribution of motive forms as Example 4.12.

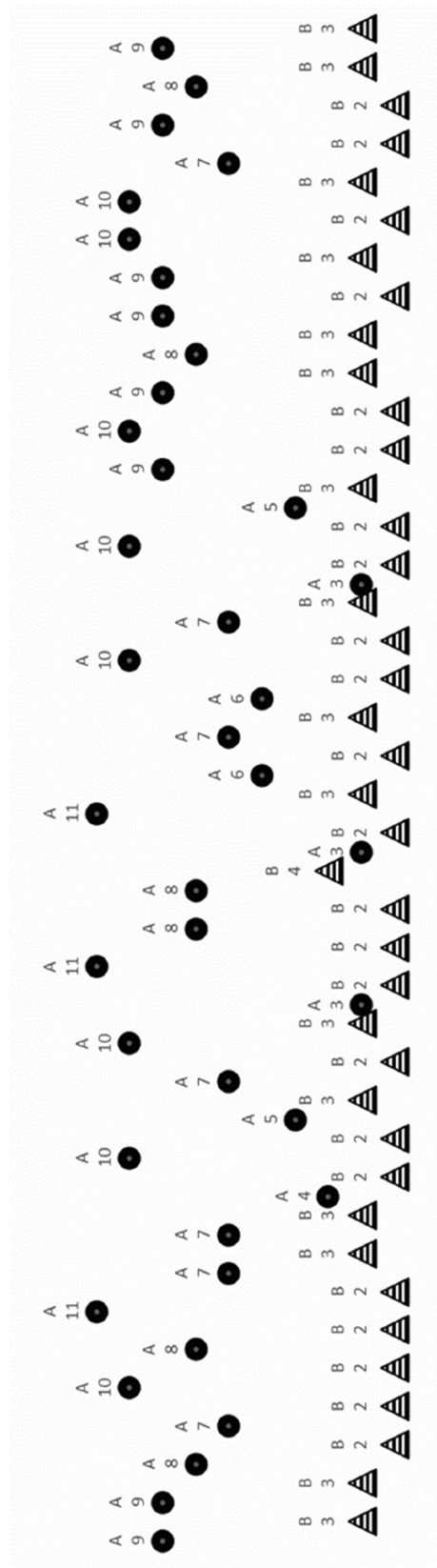
Motive B only appears in two forms, B₂ and B₃, with the exception of one instance of B₄, which appears near the middle of the track. I hear this lone elongated form as a kind of exaggerated "backfire," in which it sounds for a brief moment like the A motive attempts to restart in the middle of motive B. The locations of the two main B statements are extremely irregular; there is no readily perceptible supermotivic patterning here. Motive A likewise lacks higher-level patterning, but the situation is further compounded by the much wider range of forms, as evident in Example 4.12. What's unique about

¹³ Edward Strickland and Meredith Monk, "Voices/Visions: An Interview with Meredith Monk," in *Meredith Monk*, ed. Deborah Jowitt (Baltimore: Johns Hopkins University Press, 1997), 144.

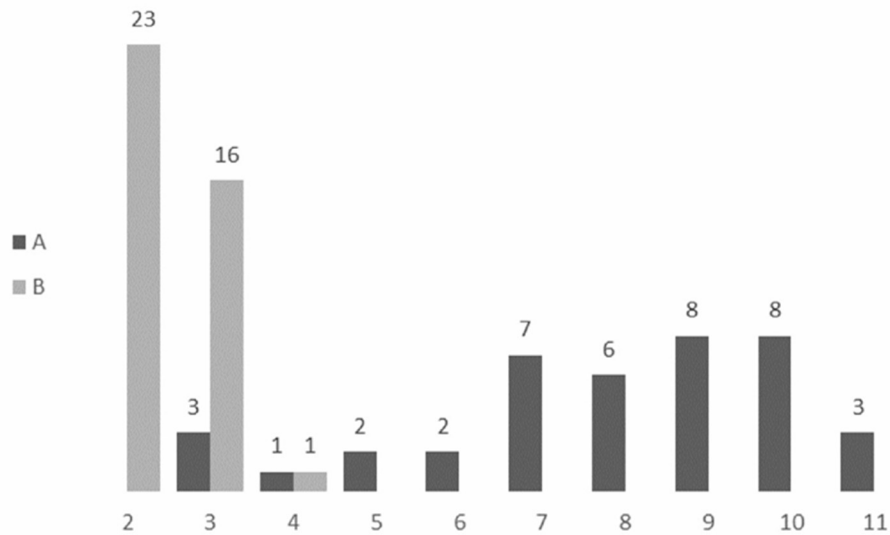
¹⁴ Tyran Grillo, "Meredith Monk: Turtle Dreams (Ecm New Series 1240)," <https://ecmreviews.com/2010/03/31/turtle-dreams/>.

Example 4.10. A transcription of the opening of Monk's *Engine Steps* (Monk, 1983)

"Engine Steps" is that so many components of this piece are predictable: the invariant rhythmic content (if not overall length) of each motive, the (lack of) pitch content of each motive, and the reliable alternation of motives A and B. Yet despite this, the work is in the end highly unpredictable. Although still present, pitch content was much less important in *Dig Deep* than in the works explored in Chapters 2 and 3; here it is removed altogether. This is MDM boiled down to its essentials, a play of pure duration in which the listener has no choice but to adhere to the incessant machinations of the engine's repetitions. Yet it is not only in mechanistic works that Monk produces Motive-Directed Meter; many of her deeply human, performative works feature similar levels of metric unpredictability, despite contrasting with the austere *Engine Steps* along nearly every musical parameter.



Example 4.11. A motive map of Engine Steps

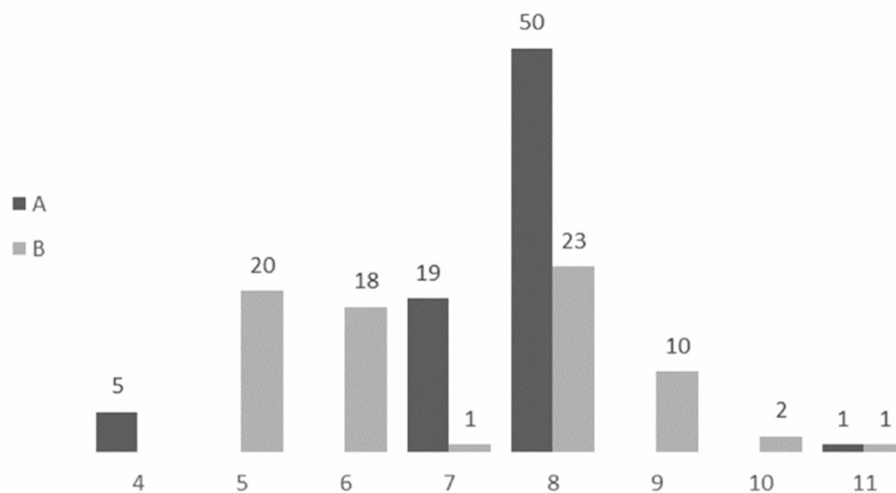


Example 4.12. The distribution of motive forms in *Engine Steps*

Consider the *Particular Dance* from Monk's 2008 album *Impermanence*. Like *Engine Steps*, this track features invariant alternation between two motives, A and B. The primary recurring motivic material of *Particular Dance* is located in the piano part, an excerpt of which is shown in Example 4.13. The A motive comprises mostly higher-register quarter-note harmonies, while B features an increased rhythmic energy and the presence of bass notes that assist in articulating the harmonies. These motives are supported by constant eighths in unpitched percussion and, most prominent of all, intermittent lyrical melodies sung in bare octaves by a small vocal ensemble. In *Engine Steps*, motive A appeared in many forms while the behavior of B was restricted to irregular vacillation between B_2 and B_3 . In *Particular Dance*, both motives are set loose; the high degree of variability is evident in the accompanying motive map of Example 4.14 and the end-state chart of Example 4.15.

Motive A has a clear prototype form, A_8 , which comprises two-thirds (50/75) of all A statements. On average, a listener would do rather well to expect this form on every recurrence of the (AB) pair; yet as evident in Example 4.14, these A_8 instances cluster together, as in the first half of section X.1 and XX.1, and the entirety of sections X.5 and the final extended XX.5. The general behavior of motive A is

Example 4.13. A transcription of the piano part from the opening of Monk's Particular Dance (Monk, 2008)



Example 4.15. The distribution of motive forms in Particular Dance

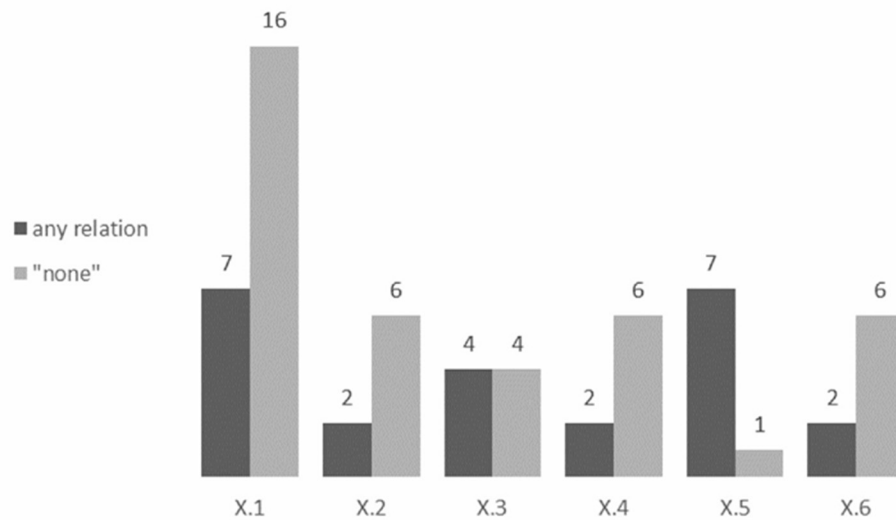
therefore an alternation between more and less stable sections, which loosely map onto different harmonic regions; this provides the listener with a considerable advantage over simply knowing that A_8 statements tend to cluster together, since harmonic information arrives at the onset of A, before the total length of that motive becomes clear. With some exceptions, motive B is stable at the same time as A, creating a predictable $(AB)_{13}$ supermotive in X.1 and XX.1, and $(AB)_{16}$ in X.5 and XX.5; we see, then, that A_8 alone cannot predict the span of B, but when combined with harmonic information, B's length becomes evident at the onset of each of these sections.

But what of the variable sections in which no consistent form of either motive A or B is present? As noted previously, motive A has a clear prototype form, A_8 . Motive B, on the other hand, is extremely flexible. Example 4.15 shows a nearly-even distribution of the forms B_5 , B_6 , and B_8 , along with a sizeable portion of B_9 and a smattering of other forms. In many places where A holds constant at A_8 , B remains elusive, as from the second half of X.3 through the first half of X.4, as well as the second half of XX.3. Here the listener is able to gain a foothold with the predictable and rhythmically steady A motive each time it recurs, before making a much more tentative prediction as to the behavior of the following B

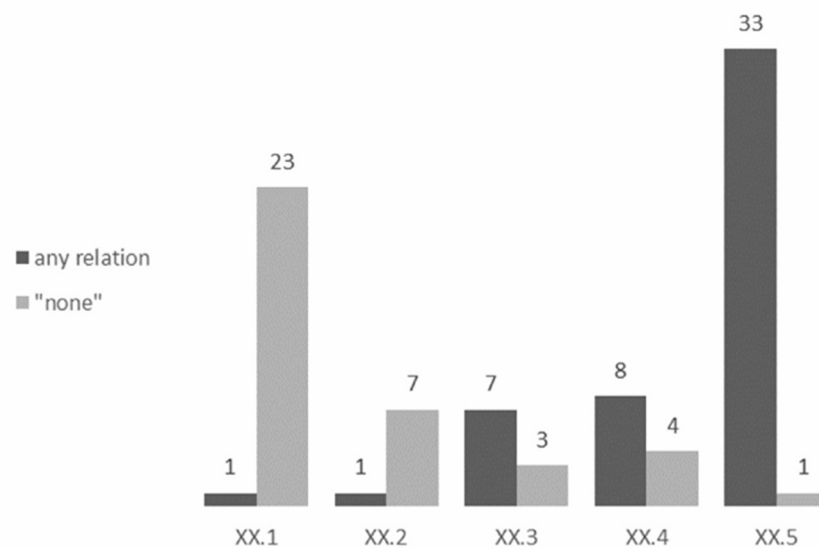
statement. Overall, there does not appear to be any clear correlation between the behavior of each motive in the more variable sections. We may describe those instances where A is constant and B varied as an oblique relationship; similar and contrary motions abound, as well.

I have divided the *Particular Dance* into two major sections, X and XX, on the basis of repeated materials, as Example 4.14 makes clear. The return of D minor harmony and the stability of the (AB)₁₃ supermotive at the start of section XX mirrors the piece's opening and marks a clear point of return. The endings of these major sections are clearly quite different, but the similarities between subsections .1, .2, and .3 are striking. Yet crucially, none of these parallel subsection repetitions are identical. Rather, subtle changes are made in section XX's subsections, which alter their metric structures relative to the corresponding subsections of X while still maintaining the same general profile; these slight changes make accurate predictions much more difficult for both first-time and repeated hearings, as the structure of the subsections of X and XX are likely to become confused. These transformations alter the metric relations that hold between successive statements in parallel subsections; Examples 4.16a and 4.17b provide a simplified summary of these relations. Note how subsection XX.1 is much more difficult than X.1, as only one pair of statements is joined by any type of metric relation in the varied XX.1. But what Example 4.16 makes unmistakably clear is the significant absence of relations across all sections, and this despite the huge number of Identity (I) relations in the final extended XX.5 subsection, which comprises only (AB)₁₆. Note that the actual groupings on the musical surface do change in XX.5, as A₈ features an intermediate pulse of (2222) and B₈ of (323). Given the extreme variability of groupings in earlier sections, listeners are likely to take a strongly parallelistic approach at first and follow these patterns closely; however, once the A₈B₈ pattern of XX.5 is recognized, they may soon shift to maintain the much easier (2222) pattern throughout, and the relation between motives will change from P to the much more stable I. This same shift may take place in earlier stable sections as well, such as X.5. Although section XX starts out more difficult than X, there is a gradual increase in the presence of

relations across XX. This stabilizing process culminates in the final extended XX.5 subsection, which obliterates the feeling of Motive-Directed Meter entirely, leaving the listener with a feeling of prototypical meter that would seem to resolve the complexities of all preceding material.



Example 4.16a. The distribution of metric relations in Particular Dance, section X



Example 4.16b. The distribution of metric relations in Particular Dance, section XX

Monk's *Particular Dance* requires the coordination of several performers, and as such, necessitates some degree of fixity. The level of complexity evident in Example 4.14 suggests that notation in some form must have been used by performers as a memory aid, be it schematic outline or traditional Western musical notation. Yet when writing many of her more intimate early solo works, we know that Monk did not use any form of notation, relying instead on the tape recorder to preserve ideas. When writing her 1976 work "Songs from the Hill," Monk related that, "At that time I didn't [notate my songs] because some of those songs are hard to notate. I would take a little tape recorder with me."¹⁵ It's unclear, however, what exactly Monk recorded; was it complete pieces recorded once finalized, preserved so as to enable direct repetition? Or did Monk simply record fragments and ideas, the combination and arrangement of which had to be remembered and reenacted anew each performance? In order to probe this question, let's turn to examine one early song, "High Ring" from Monk's 1972 album *Our Lady of Late*.

A complete transcription of "High Ring" is provided as Example 4.17. Note that this transcription does not notate the constant F-sharp drone that opens the track and extends uninterrupted until after the voice finishes singing, which serves as an invariable pitch reference for the singer. The song features a restricted pitch range, spanning D4-G4, and a limited number of rhythmic values (eighth, quarter, and sixteenth notes and/or rests). As a result of this limited range of expression, the musical surface is oversaturated with similar material, making distinctions between musical motives somewhat more ambiguous than in prototypical examples of Motive-Directed Meter. The Flexible Metric Space, introduced in Chapter 1, compares musical materials according to pulse periodicity, hierarchic depth, and motivic saturation.¹⁶ Example 4.18 shows the general location of "High Ring" in this space—in particular, how it pushes away from prototypical MDM—and away from prototypical meter in general—

¹⁵ Strickland and Monk, "Voices/Visions: An Interview with Meredith Monk," 144.

¹⁶ See Chapter 1, Part II.

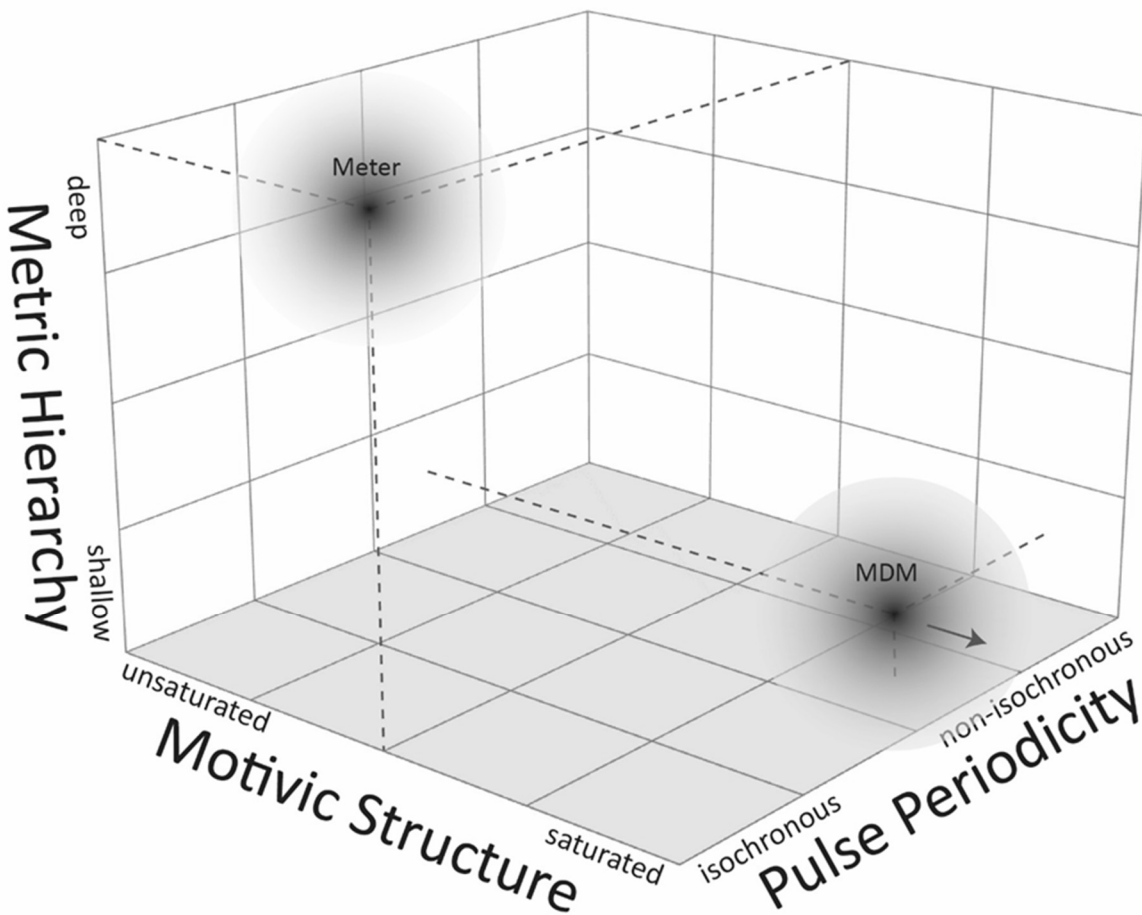
The image displays a musical score for the piece "High Ring" by Thelma Houston, transcribed by Monk in 1986. The score is presented in five staves, each with a treble clef and a key signature of one sharp (F#). The tempo is marked as 0:04 and the time signature is 4/4. The score is divided into measures by bar lines, and the measures are numbered 1 through 17. Chord annotations are provided for each measure, enclosed in boxes. The chords are as follows:

- Measure 1: A₁₄
- Measure 2: B₄
- Measure 3: A₆
- Measure 4: C₃₈
- Measure 5: A₄
- Measure 6: B₆
- Measure 7: D₆
- Measure 8: B₆
- Measure 9: D₈
- Measure 10: A₁₆
- Measure 11: A₄
- Measure 12: B₃
- Measure 13: D₆
- Measure 14: B₆
- Measure 15: D₈
- Measure 16: A₁₆
- Measure 17: A₄
- Measure 18: B₃
- Measure 19: D₆
- Measure 20: B₆
- Measure 21: D₈
- Measure 22: A₁₆

Example 4.17. A transcription of Monk's High Ring (Monk, 1986)

The image displays a musical score for a piano piece, specifically a transcription of Monk's 'High Ring' (1986). The score is presented in four staves, each beginning with a treble clef and a key signature of one sharp (F#). The first staff starts at measure 23 and includes chord markings A₆, B₆, D₁₀, and A₆. The second staff starts at measure 27 and includes C₂₉. The third staff starts at measure 28 and includes B₆, D₈, A₆, B₆, D₈, and A₁₄. The fourth staff starts at measure 34 and includes C₂₁. The notation consists of eighth and sixteenth notes, with some measures containing rests or ties. The chords are indicated by letters with subscripts, likely representing specific voicings or fingerings.

Example 4.17. A transcription of Monk's High Ring (Monk, 1986) (continued)



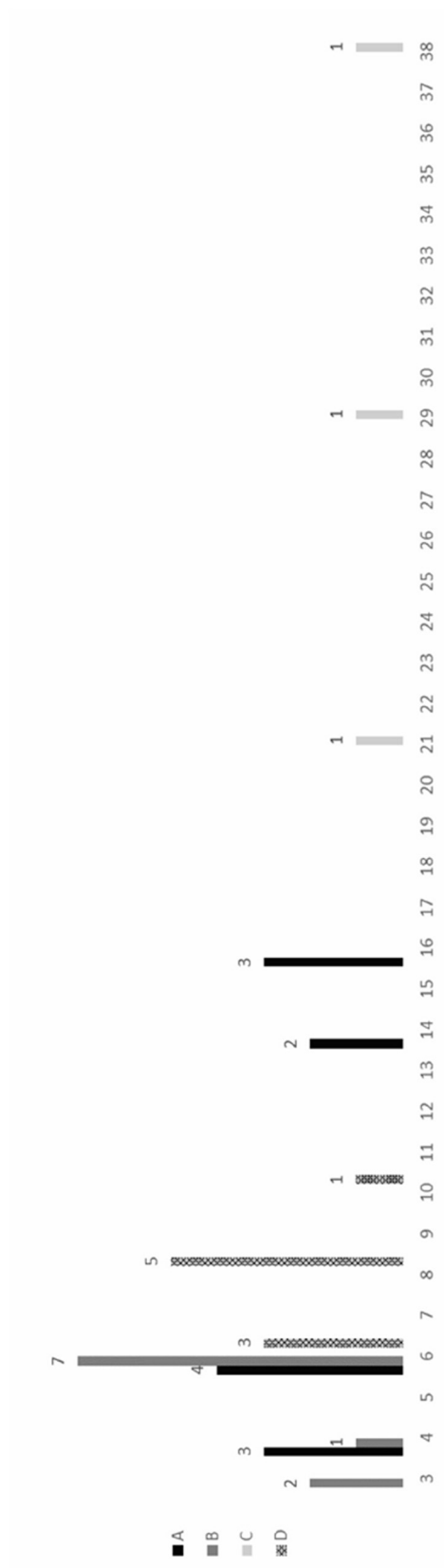
Example 4.18. The FMS depicting how High Ring trends in relation to prototypical MDM

because of the very high level of motivic saturation. There are many ways to parse the motivic structure of this song, but as my transcription makes clear, I divide it into four motives, each of which is varied throughout the course of the song. The motive map for this parsing is shown in Example 4.19. The changes of motive and of durational span are unrelenting; only the 6-unit is ever repeated more than once in succession, as $B_6D_6B_6$ (mm. 6-8), D_6B_6 (mm. 13-14 and 19-20), and A_6B_6 (mm. 23-24 and 30-31). Otherwise, the change is constant, and even the mostly reliable eighth note—which appears to act as unit pulse through much of the song—becomes disrupted in the first two statements of motive C, which features triple sixteenth-note groupings. Indeed, this C is something of an outlier, for whereas motive

statements are mostly brief and typically express stable Kirnberger meters, C is quite expansive. This aberrant behavior is evident in the end state motive form chart of Example 4.20.

With the exception of one D₁₀ and two A₁₄ statements, all non-C instances represent Kirnberger meters, which greatly contributes to the overall stability of this brief song. Even the larger two C statements, C₂₉ and C₃₈, which feature triple sixteenth groupings, disrupt the eighth note unit pulse only locally; since both feature an even number of sixteenths, a listener pursuing a partially inertial approach can maintain the eighth note pulse throughout, softening these otherwise difficult extended metric structures. Although the Kirnberger motive statements may not themselves be difficult, the variability of each motive and irregularity of the succession creates an environment that readily facilitates Motive-Directed Meter. Only motive B has a clear prototypical form (B₆), though the initial B statement is the non-prototypical B₄ form of m. 2, which will delay the acquisition of this prototype.¹⁷ On the whole, this song is quite difficult to track metrically, though it is not without higher-level patterns. Mm. 11-16 are metrically and motivically identical to the immediately following mm. 17-22, creating the admittedly quite complex superstructure A₄B₃D₆B₆D₈A₁₆, indicated with brackets in Example 4.19. Although the repetition of the 6-unit in the center of the structure, if recognized, will aid predictability, the two versions of each of the three constituent motives are different, making it impossible to settle on a prototypical form of any of the three for this central section. Furthermore, the preceding bars, mm. 5-10, present only a slight alteration to this structure, replacing the second statement, B₃, with B₆. This has a twofold stabilizing effect. First, there is now a threefold repetition of the 6-span across mm. 6-8, creating the most metrically stable metric/motivic group in the entire song. And second, in this first version of the superstructure (A₄B₆D₆B₆D₈A₁₆), only one form of motive B is presented. This helps to

¹⁷ Prototype Preference Rule 3 privileges motive forms at moments of important formal articulation, especially beginnings. See Chapter 2, Part III.



Example 4.20. The distribution of motive forms in High Ring

counteract the aberrant first B_4 instance of B in m. 2—the only statement to group the eighth into binary pairings—and to pave the way for the triple eighth groupings to come in all subsequent B statements.

These three nearly identical motive groupings are bordered by a four-motive introduction—culminating in the first massive C_{38} statement—and a twelve-motive conclusion that seems to suggest the supermotivic group at several points, including mm. 23-25 ($A_6B_6D_{10}$) and 30-32 ($A_6B_6D_8$), and which features the remaining two statements of C. This recurring high-level pattern urges us to consider the contents of Monk's tape recorder; for although the goals of this analytic project are fundamentally esthetic in nature, it's worth asking whether complexity and patterning in MDM may be able to give us insight into the compositional process. Monk's recorded material must fall somewhere on the spectrum between individual motivic ideas in isolation and the entire piece laid out from end to end, yet neither of these extremes seem plausible; the former would lack interconnection, while the latter would strain the limits of human memory. Some shorter set of motive statements therefore seems more likely. Indeed, our recurring six-statement supermotivic group seems of the perfect length to be easily retained in short-term memory, to provide a relatively detailed accounting of motivic connections, and to give multiple examples of relevant variation techniques. Given the exact and near-exact repetitions of this group in the recorded version, it's all but necessary that multiple hearings would have been required to retain such complex patterns in memory. It therefore seems plausible that this supermotivic group, or something quite like it and of similar duration, may have formed an important part of Monk's recorded material during the compositional process.

In the preceding works by Vivian Fine, Julia Wolfe, and Meredith Monk, we have seen a diverse set of approaches to the composition of Motive-Directed Meter that forge new types of metric experiences. Fine and Monk, in particular, have played with the ways in which MDM comes into being—Fine by considering the metric affordances of MDM passages under the transformation of boilerplate

compositional techniques, and Monk through use of improvisation and alternate technological tools, namely the tape recorder in place of traditional notation. The influence of a minimalist or post-minimalist aesthetic is also evident here in the works of Wolfe and Monk, in works like *Dig Deep* and *Engine Steps*, where the metric patternings themselves become the primary point of focus while other musical parameters recede to the background, producing MDM in its purest instantiations we've yet seen. Yet this cursory overview of metric innovations in recent compositions is only the beginning of the story, for many popular music artists have, in the past few decades, produced MDM in drastically different stylistic contexts. The next section examines some examples of this work and provides an outline of certain notable trends.

II. METRIC EXPERIMENTATION IN RECENT POPULAR MUSICS

This chapter is not primarily historical in nature. Nevertheless, I think it important, at the outset of the present section, to caution against the creation of tidy historical narratives. Positioned as it is after chapters on Stravinsky, and following the previous section on late twentieth- and early twenty-first century "classical" composition, it may seem as though I am proposing that Motive-Directed Meter in popular musics evolved from, or has been directly inspired by, these earlier developments. In the absence of supporting evidence, this hypothesis remains unsupported. Two other possibilities seem equally likely. First, this may simply be a case of convergent evolution, whereby various artists have arrived at similar techniques without any knowledge of each other's work. And second, there are many possible sources of influence from within the popular music tradition itself. Consider, for example, the work of early blues artist Bukka White, in songs such as "Fixin' to Die Blues" (1940) and "Aberdeen Mississippi Blues" (1940). These tracks both feature clear pulsation that is perceptually isochronous at the unit pulse and tactus but flexible at slower pulse levels, necessitating frequent changes of

entrainment.¹⁸ Similarly, Joti Rockwell has explored the concept of “crooked tunes” in bluegrass musics, which feature disruptions which preclude an invariant metric hierarchy.¹⁹ These few examples highlight the complexity of this question of influence, which is well beyond the scope of this project. With this caution in mind, let’s turn to consider how Motive-Directed Meter manifests in popular musics today.

The Role of the Riff

The *riff* is an often-discussed, but under-theorized component of popular music song structure. The term is commonplace enough that scholars seem to assume that its definition is understood, yet the only proper definition I have been able to locate—which I have yet to see cited in literature that discusses riffs—comes from *Grove Music Online*, in which riff is described as a “Short melodic ostinato which may be repeated either intact or varied to accommodate an underlying harmonic pattern.”²⁰ The author then describes a number of examples, ranging from early blues and jazz patterns to blues-inspired rock and more complex progressive rock instances. The inclusion of the term “melodic” in this definition is instructive, for indeed, as in the case of motive, the melodic/rhythmic profile is the crucial defining element—a harmonic framework may support this central activity, or the melodic lines themselves may suggest an underlying harmonic structure, but this parameter is of secondary importance. Indeed, the riff may be thought of as a motive or a supermotivic collection of motives that repeat in an unchanging order. Distinctive melodic riffs of this type generally first appear outside of the

¹⁸ Thanks to Richard Cohn for drawing my attention to these songs.

When Bob Dylan recorded his version of “Fixin’ to Die” in 1962, many of these metric shifts were normalized; those that remained were standardized into identical recurrent metric changes at specified song locations.

¹⁹ Joti Rockwell, “Time on the Crooked Road: Isochrony, Meter, and Disruption in Old-Time Country and Bluegrass Music,” *Ethnomusicology* 55, no. 1 (2011): 58.

²⁰ J. Bradford Robinson, “Riff,” in *Grove Music Online*, ed. Stanley Sadie (Oxford Music Online, 2001).

primary verse and chorus sections of popular songs, in introductions and interludes, and may then extend into these key sections, undergirding the primary melodic material of that section.

Riffs play an important role in articulating the metric structure of songs, which tend to be overwhelmingly duple. The duple bias of Western music is well-known; David Huron conducted a survey of themes contained in Barlow and Morgenstern's 1948 *Dictionary of Musical Themes*, and concluded that over half (54.6%) expressed pure duple metric structure.²¹ The majority of the remaining themes contained a single triple relationship at some level of the metric hierarchy, while only 1.3% contained two triple relationships (Huron's "compound triple," such as 9/8) and 0.8% were "irregular" ("5/4, 7/8, etc."). In popular music, the bias towards duple structures is much more strongly pronounced. In 2004, *Rolling Stone* published its "500 Greatest Songs of All Time" list, created by polling 172 "rock stars and leading authorities." As Trevor de Clercq and David Temperley note, the list features a bias towards earlier decades of rock history, particularly the 1960s.²² Not only this, but the list is strongly biased in favor of male performers; only 14% of the 500 songs feature female artists.²³ Despite these obvious shortcomings, the list will provide a useful starting point for a cursory consideration of meter usage in popular music, and I will balance it out with the 100 most recent songs to reach number one on Billboard's *Hot 100* list, as of May 2010. The distribution of meter types in these 200 songs is given in Example 4.21.²⁴ The sample size is of course quite small, but it's evident that the much greater metric

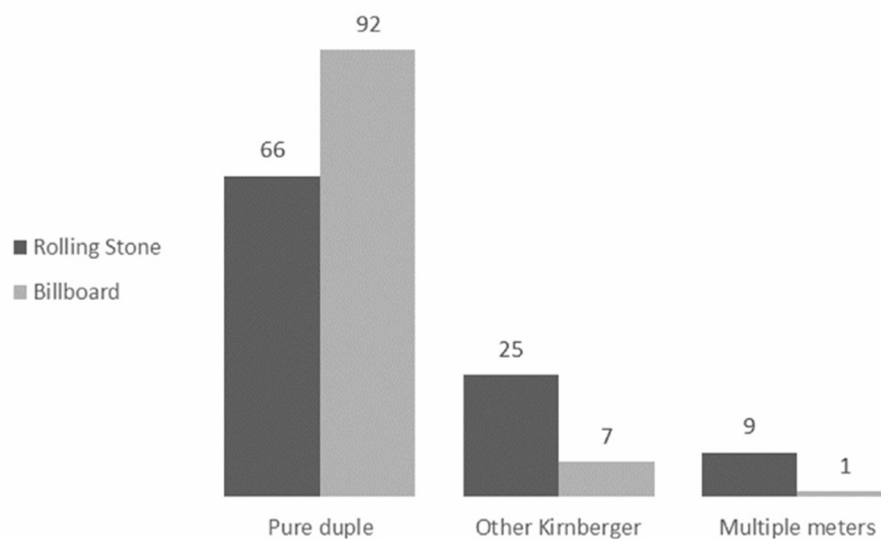
²¹ David Huron, *Sweet Anticipation: Music and the Psychology of Expectation* (Cambridge, MA: MIT Press, 2006).

²² Trevor de Clercq and David Temperley, "A Corpus Analysis of Rock Harmony," *Popular Music* 30, no. 1 (2011): 51.

²³ This ratio becomes starker as the list approaches the "greatest" songs: 21 of the lower 100 (401-500) feature women, but only 8 of the top 100 (1-100).

²⁴ Cited in Daniel Cox, "Ameterical Technical: Difficulties of Entrainment in a Metal Subgenre" (Eastman School of Music, 2010), 3.

variety in the Rolling Stone list is a product of the aforementioned bias in favor of progressive rock and psychedelia, which tend to feature significant experimentation in various musical parameters.²⁵ Tracks in the “multiple meters category” in Example 4.21 include “Strawberry Fields Forever” (1967) by The Beatles, “The Weight” (1968) by The Band, and “Tangled up in Blue” (1975) by Bob Dylan. The Billboard list is much more representative of contemporary popular music, and as the example makes clear, this repertoire is much more strongly biased in favor of pure duple meters. The only song in the list that contains meter changes is the 2003 track “Hey Ya!” by OutKast, which is pure duple throughout with the exception of one recurrent change in the chorus.²⁶



Example 4.21. The distribution of meters in the top 100 songs of the Rolling Stone’s 500 Greatest Songs of All Time and the 100 most recent songs on the Billboard Hot 100 list (as of May 2010)

²⁵ John Covach employs the term “hippie aesthetic” to describe the shift towards increasing complexity in the 1960s and 70s: “The basic idea behind the hippie aesthetic,” he writes, “is that the rock musician is an artist who has a responsibility to produce sophisticated music using whatever means are at his or her disposal.” John Covach and Andrew Flory, *What’s That Sound? An Introduction to Rock and Its History*, Fifth ed. (New York; London: W.W. Norton and Company, 2018), 295.

²⁶ The metric structure of the chorus of “Hey Ya!” is (444244).

Example 4.21 makes clear the strong duple bias of recent popular music; the riff is a crucial element in expressing and continually reinforcing the underlying metric framework. Consider the energetic riff from the 2006 song “I Need All The Friends I Can Get” by the Scottish indie band Camera Obscura, transcribed in 4.22. The riff presents significant syncopation, yet the underlying metric framework is clear. The tactus pulse is held down by the percussion instruments, which emphasize the “backbeat” feel typical in popular music repertoires, despite the absence of the usual kick and snare drums. Although technically in conflict with the metric hierarchy as traditionally conceived, in practice the backbeat is considered rhythmically and metrically consonant in popular musics.²⁷ The claps further emphasize the backbeat with a set of eighths, which strengthen the anacrusic function of the stressed beats 2 and 4. Against this clear metric structure the guitar syncopates a 332 “tresillo” rhythm, one common manifestation of the widespread “Platonic” or “Euclidian” grouping pattern identified by scholars in popular musics.²⁸ Rather than distorting the underlying metric hierarchy, this grouping dissonance brings it into focus by urging entrainment and encouraging bodily engagement.²⁹ The arrival pulse is articulated by the repetitions of the riff itself, which spans four quarter notes. Indeed, each level of the metric hierarchy is unambiguously expressed by some aspect of the riff: the quarter-note pulse by the percussion instruments, the half-note pulse by the accentual structure of these same instruments, the whole-note pulse by the repetitions of the entire riff, and the first hypermetrical level by the alternating harmonic character of successive riff statements (C major, G major).

²⁷ Nicole Biamonte, “Rhythmic and Metric Theorization in Rock Music,” in *The Bloomsbury Handbook of Rock Music Research*, ed. Allan Moore and Paul Carr (New York; London: Bloomsbury Academic, 2020), 142-43.

²⁸ Richard Cohn, “A Platonic Model of Funky Rhythms,” *Music Theory Online* 22, no. 2 (2016).
 Godfried Toussaint, “The *Euclidian* Algorithm Generates Traditional Musical Rhythms” (paper presented at the Proceedings of BRIDGES: Mathematical Connections in Art, Music and Science, Banff, Canada, July 31 - August 3 2005).

²⁹ Maria A. G. Witek et al., “Syncopation, Body-Movement and Pleasure in Groove Music,” *PLoS ONE* 9, no. 4 (2014).

0:04 ♩ = 138

Guitar

Clap

Tamb. & Shaker

Example 4.22. A transcription of the opening riff from Camera Obscura’s “I Need All The Friends I Can Get” (Camera Obscura, 2006)

“I Need All The Friends I Can Get” shows the typical role of the riff in popular musics. Simultaneously presenting a recurrent rhythmic groove, harmonic framework, and clear metric patterning, the riff sets the stage for the verse which is to follow and which—in this and many other cases—it continues to undergird. Several composers have chosen this important component of the popular song form as a prime site for metric experimentation. Indeed, one of the most common manifestations of Motive-Directed Meter in popular songs occurs in riffs alone, which are bordered by stable verses and choruses featuring prototypical meters. One such example is the song “Marie Antoinette” (2008) by the Portuguese post-hardcore group If Lucy Fell, which contains the metrically variable riff transcribed in Example 4.23. Despite the high variability shown here, several features guide the listener through this experience. Although no span is repeated in succession, the 7-unit (322) span that opens the phrase does occur twice, serving as a recurrent reference point—though the variability index (VI) of 4 does detract from its grounding function. More significantly, each statement begins and ends with an accented quarter note. This provides clear signaling to the listener as to not only the location of the downbeat, but also the location of the preceding “upbeat” and—crucially—the length of that upbeat, which is invariant. My metric displacement index methodology, focusing as it

The image displays a musical score for the main riff of the song "Marie Antoinette" by the band If Lucy Fell. The score is written for two instruments: Guitar and Drums. The Guitar part is on the left staff, and the Drums part is on the right staff. The score is divided into measures by vertical bar lines. Measure numbers are indicated in boxes above the staff: 0:00, 7, 15, 7, and 5. The tempo is marked as ♩ = 330. The Guitar part features a series of eighth and sixteenth notes, often beamed together, with some measures containing triplets. The Drums part consists of a steady eighth-note pattern, with some measures featuring a snare drum hit. The score is presented in a clean, black-and-white format.

Example 4.23. A transcription of the main riff from “Marie Antoinette” by If Lucy Fell (If Lucy Fell, 2008)

does on metric depth mismatches at points of *arrival*, is therefore poorly equipped to handle this situation, in which mismatches can be recalibrated on the final quarter of each bar, ensuring that actual arrival points are always predicted correctly. The method could, however, be easily retooled to consider adjustments at other metric locations. It is because of these clear anticipatory events that I've parsed this riff into four units rather than five, despite the relatively imbalanced length of the second statement. Although more than twice the length of adjacent statements, and despite expressing a varied echo of the statement's opening at roughly its halfway point, there is no clear arrival signal at any interior point inside A₁₅. One final aid to the listener is the varied structure of the final A₅ statement, which features a pickup and arrival point at different pitches than all other statements (B and F sharp in place of A and B), a distinction which helps to articulate the boundary of the entire four-statement riff.

We can reduce the A₇A₁₅A₇A₅ sequence of motive forms in "Marie Antoinette" to the abstract structure XYXZ, in which X functions as the prototypical form and Y and Z as distinct variants. This particular sequence is extremely common in examples of riff-based MDM. The pattern can be found in divergent genres and eras, from Happy the Man's 1977 progressive rock classic "Stumpy Meets the Firecracker in Stencil Forest" to the 2007 technical metal track "Synaptic Plasticity" by Blotted Science, shown in Chapter 1.³⁰ One recent instance of XYXZ is transcribed here as Example 4.24, a riff from "I Love Turbulence" (2008) by the experimental British rock group Rolo Tomassi, whose work will feature prominently in this chapter. This riff consistently presents unambiguous arrival points on quarter-note events on the pitch center C, and even hints at the type of anacrusic signals found in If Lucy Fell's "Marie Antoinette." Statement 2, for example—the "Y" statement"—concludes with a high quarter note that stands out from the rest of the statement material; a listener will be able to quickly learn the anticipatory function of this solitary high pitch. Less distinct are the E flat quarters that end statements 1

³⁰ At least three distinct riffs feature this XYXZ design in "Synaptic Plasticity." For one example, see Chapter 1, Part III.

0:00 ♩ = 170

3 5 3 9 (7+2)

Guitar

Drum Set

Example 4.24. A transcription of the opening riff from “I Love Turbulence” by Rolo Tomassi (Rolo Tomassi, 2008)

and 3, though once the XYZ structure is internalized, these too will serve as signals for the oncoming arrival points. I have also divided the final 9-unit statement into 7+2 as a result of the clear harmonic change and contour shift that occurs in the final four eighth notes. Given the significant length of the 9-unit relative to what came before, the listener will be ready for an arrival point, and may initially take up this confluence of parametric shifts as its location. Yet the clear return of X and the beginning of the pattern only two beats later will force a reevaluation of this impression, encouraging a reconsideration of the felt arrival point to a retrospective understanding of its role as a two-beat anticipation of the beginning of the four-statement cycle.

Whereas the version of XYZ found in “Marie Antoinette” featured a lengthened Y and shortened Z, “I Love Turbulence” showed us the reverse: a shortened rendition of the main motive in position Y, sandwiched between the two prototypical statements, with a lengthened Z version that delays the onset point of the whole cycle or following section. We can notate the former as (X + X -), and the latter as (X - X +), and term these variants *premature* and *delayed*, respectively. These labels describe the function of each relative to the “hypermetric” arrival point at the end of the cycle; in other words, the shortened statement at the end of (X + X -) delivers the hypermetric arrival earlier than expected, while the expanded statement at the end of (X - X +) pushes that point later than expected, resulting in a buildup of anticipation for that metrically deep moment of arrival. This delayed variant is much more common than the premature version. Indeed, “Marie Antoinette” is the only premature example I’ve located. It may be that the (hyper)metric depth of this arrival point lends it such significance that delaying this moment is an effective way of building meaningful feelings of anticipation and suspense. Note also that, considering both versions of XYZ at the hypermetric level, the normative prototypical “X” versions appear at the relatively deeper positions 1 and 3, while the shallower positions 2 and 4 are available for alteration and variation.

Rolo Tomassi play with the XYXZ formula further in “Unromance” (2010), transcribed in Example 4.25. Two things stand out regarding this example. First, the “Y” statement, $(AB)_{14}$, is actually the exact same length as the prototypical X form, also $(AB)_{14}$. This potential confusion—and new variation of XYXZ relative to the “premature” and “delayed” versions outlined above—is a product of the hypermotivic structure of this riff, where individual “statements” are actually two-motive sets. Position X presents A_8B_6 , while Y gives us A_6B_8 . As the guitar and drum parts of the transcription make clear, the arrival points of both motives A and B are unambiguous, and so the distinction between these two versions of $(AB)_{14}$ is sure to be felt by all but the most inertial of listeners. Second, and more impactfully, this riff is five statements long rather than four. After the Z-position $(AB)_{18}$ (A_6B_{12}), which, in its elongated form, would seem to set up an altered rendition of the delayed XYXZ variant (X X X +), A_8 returns. As a result of both hypermetric expectations and stylistic expectations based on a familiarity with the common XYXZ structure, we are primed to hear this A_8 as a restarting of the cycle, even before it is confirmed as the 8-unit variant that indeed begins the first $(AB)_{14}$. Yet rather than the expected B_6 , we are met with not B at all, but another statement of A!³¹ Obviously this unexpected A motive runs contrary to expectations, a fact that overrides the cursory sense in which the 6-unit span might be able to conform to the listener’s expectation for B_6 . Given the quite different behavior of motives A and B, motivic inertia will be operative, preventing motive A from “filling in” for motive B. When A_6 arrives, it becomes quite clear that the pattern has not repeated, but rather presented a kind of “fake out” in which the return was signaled while the section continued to unfold. This impression is confirmed when the actual end of the section follows shortly thereafter, when either $(AB)_{14}$ recurs upon repetition or the subsequent section of material begins. This final $(AA)_{14}$ gets tacked on to the end of the riff, retrospectively creating the 5-

³¹ This decoupling of A and B is the primary reason I’ve chosen to parse the passage into separate motives A and B, rather than one larger motive with two submotivic regions. Indeed, other than this decoupling, the B motive here functions similarly to how the lower accented pitches create dialogue with the higher line in If Lucy Fell’s “Marie Antoinette,” discussed above.

0:07 $\text{♩} = 288$

X $(AB)_{14}$ A_8 B_6

Y! $(AB)_{14}$ A_6 B_8

X $(AB)_{14}$ A_8 B_6

Z $(AB)_{18}$ A_6 B_{12}

A $(AA)_{14}$ A_8 A_6

Guitar

Drum Set

Example 4.25. A transcription of a riff from “Unromance” by Rolo Tomassi (Rolo Tomassi, 2010)

statement hypermetric structure shown in the transcription. The end result is a significant intensification of the “delayed” riff form described above, in which *XYXZ* is expanded to *XYXZA*, delaying the hypermetric arrival point by—in addition to the elongated form of *Z*—the addition of an entire motive statement.

Another Rolo Tomassi track “*Sakia*” (2010), transcribed as Example 4.26, provides an example of riff-based Motive-Directed Meter taken beyond the scope of a short repeating phrase, as highlighted in the previous few excerpts, and shows how a durationally manipulated riff can become the basis of an entire brief section. In truth, one could find multiple motives in this 14-statement passage, distinguishing, for example, that which begins with the chromatic half step *D-C sharp* (statements 2, 9, 14) from that which opens with a descending tritone from *C sharp* to *G* (statements 4, 7, 12). Yet generally these statements are slight variations of each other; the tritone-beginning statements, for example, simply lack the initial *D* of the half step-beginning statements, the latter of which immediately then proceed to that same *C sharp-G* tritone. Each statement begins with a sequence of quarter notes, producing a level of local rhythmic and metric stability that further washes over slight differences between statements. For these reasons, a listener may well approach each statement with a similar set of expectations, enacting a strategy more akin to local inertia than the motivic inertia seen in previous examples.

Although not governed by the familiar small-scale *XYXZ* structure, there are other principles at work aiding predictability in “*Sakia*.” Each motive statement features terminal anacrustic gestures, which, as observed in “*Marie Antoinette*” and “*I Love Turbulence*,” greatly improve predictability of the subsequent arrival; even the opening 5-unit statement is preceded by a pickup figure. Yet unlike the examples seen so far in this chapter, these pickup figures are of variable length, ranging between two, three, four, and five eighths, as diagrammed in Example 4.27, which shows the lengths of the overall

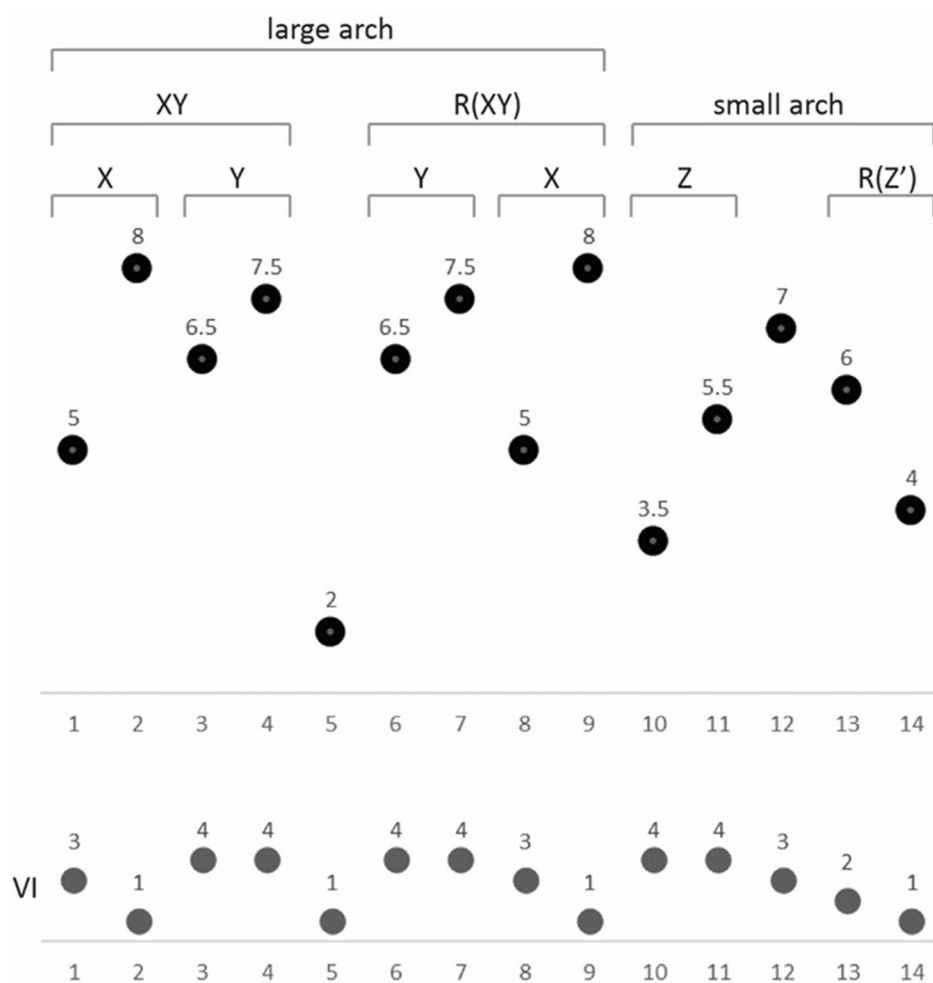
The image displays a musical score for an extended riff section from the song "Sakia" by Rolo Tomassi. The score is written for two instruments: Guitar and Drum Set. The tempo is marked as 163 BPM. The score is divided into three systems, each containing two staves. Measure numbers are enclosed in boxes above the guitar staff.

System 1: Measures 10, 13, 15, and 16. The guitar part features a complex riff with various note values and accidentals. The drum set part consists of a steady pattern of eighth notes.

System 2: Measures 4, 13, 15, and 16. The guitar part continues the riff, with a measure rest in measure 13. The drum set part maintains the eighth-note pattern.

System 3: Measures 7, 11, 12, and 14. The guitar part shows a variation in the riff, with a measure rest in measure 11. The drum set part continues with the eighth-note pattern.

Example 4.26. A transcription of an extended riff section from "Sakia" by Rolo Tomassi (Rolo Tomassi, 2010)



Example 4.27. A motive map and VI values for "Sakia"

statements, as well as their submotivic components.³² Although there are some differences that might aid a listener in determining the length of one of these pickups as it unfolds, the differences are slight, and inconsistent enough to require extensive familiarity to capitalize on them. The pickup figures do prepare the listener to expect an incoming arrival point, but not for the exact timepoint at which that arrival will occur; this may do more harm than good, as feelings of imminent arrival are continually followed by thwarted expectations.

³² To aid readability, this and many future examples count spans relative to the tactus, rather than the unit pulse.

Given the variability of the submotivic components, they cannot be relied upon for prediction-making; rather, a moderately familiar listener may turn to the higher-level “arch” patterns shown in Example 4.27. Two statement pairings, labeled “X” and “Y,” occur twice each, though in swapped orderings: (XY) in mm. 1-4, and (YX) (or R(XY)) in mm. 6-9. This produces a large arch form across mm. 1-9 revolving around the brief 2-unit statement of m. 5 as a central node. The final five bars present a similar arch in miniature: mm. 10-11 has two increasing statements—3.5- and 5.5-units—which I call “Z,” while mm. 13-14 give a varied form of their retrograde, concluding the passage with the 6- and 4-units comprising R(Z). This small arch also contains a central node, this time the 7-unit of m. 12. These final 5 bars act as a kind of shortened “echo” of the larger arch of mm. 1-9. Of course, the perceptibility of these structures is questionable, particularly for new listeners. Rather than the arch forms themselves, I think it likely that a listener will begin, after many hearings, to associate certain forms with one another in a rather loose way—recognizing, for example, that the 5-unit and 8-unit often appear together, though their ordering may remain unclear. These complex structures would be an interesting testing ground for future researchers to explore the process of rote memorization in the post-prototype stages of expectation, as discussed at the end of Chapter 3. After all, there are no clear prototype forms in this passage; in what rough order, then, will a listener gradually untangle this metric snarl?

Rather than focusing on uncertain larger patterns, let’s consider some more local experiences to which our analytic tools provide ready access. Beneath the motive map of Example 4.27 is a chart of variability index (VI) values for the passage. The VI is quite high on average, in large part because of all of the VI 4 fractional motive statements that disrupt the tactus pulse. There are, however, a few moments of respite: the 8-units in the “X” pairs (mm. 2 and 7) are extremely stable, though they are difficult to locate. So too is the 2-unit of m. 5 in the center of the Large Arch. Since span negatively correlates with stability in low VI meters, this statement doesn’t provide much stability; rather, it acts as a kind of “false start” statement that immediately transitions into the pickup figure as soon as it is recognized as a new

statement. The consistent decrease of VI across the concluding Small Arch gradually transitions the listener out of the thorniest MDM of the riff, preparing them for the more metrically normative material to follow. In addition, only the Ordered subset/superset (O) metric relation can be found in this passage; this obviously presents a smoother connection between adjacent statements than those places where no relation holds. The two O relations near the end of the section are the only instance of this succession of connection-smoothing relations, further lessening tension at the riff's conclusion. Note also the nature of the varied forms between Z and R(Z') in the Small Arch. The latter two statements add one eighth each to fractional statements of Z so that they no longer disrupt the tactus pulse, allowing the half note pulse to come into view at the section's closing. Yet in spite of all of these ameliorating properties of the Small Arch, there is one way in which it defies the listener: none of the motive forms of the Small Arch appears at any time in the preceding Large Arch, nor are any repeated within the Small Arch itself. The riff thus concludes with five completely new motive statements, fully disrupting both metric inertia and any possible nascent sense of prototype motive form. Although itself less metrically jarring than the Large Arch, the Small Arch acts as a kind of "echo" to its larger counterpart, one which distorts, rather than clarifies, metric expectations set up in the first two-thirds of the passage.

The External Enumerator

We have seen that the instrumental riff sections that occur before and between major song sections are a fertile ground for metric experimentation. In some cases, the vocalist participates in these riffs, sandwiching these sections in an ambiguous middleground between interlude and major song section. Later on, we will consider sections of MDM where a melodic vocal line is a primary object of attention. But first, what happens when, instead of providing vocals in a traditional sense, the singer counts out loud in time with the music, serving as a kind of conductor who points out the metric changes in which they simultaneously participate? This technique can be seen in "Your Goose is Cooked" (2008) by the

London-based group Mayors of Miyazaki, transcribed in Example 4.28. The track opens with the lead vocalist alone shouting “one, two, three, four,” a common refrain used to count in the initial downbeat of a song. As expected, the guitar and drums enter on the next beat, seeming to kick the song off with a rising chromatic gesture. Yet the guitar is suddenly cut off a few short beats later, and the vocalist returns, counting once again; though this time he only makes it to the count of “two.” This intro continues like this, making a game of the count-in by creating a call-and-response texture between the vocalist and the rest of the band. This pantomime plays out in a landscape of shifting meters, as if the band members cannot come to an agreement as to just what the meter of the song ought to be. Only after this transcribed section concludes does the song properly begin with the first verse, a section which is relatively metrically stable.

Yet the following verse does not emerge as a result of consensus; the juxtaposed performing forces never do manage to agree in this introduction. Each time the singer counts out a pattern, the instrumentalists play something else, forcing him to try something different. In the end, they seem to come together by chance to play the following verse that expresses a new meter not suggested by anyone in the introduction. Not until the fourth of the five (AB) pairings does either group attempt a grouping they’ve presented previously, when the instruments play the B_3 from pair 1, though now at a new pitch level. The vocalist follows in pair 5, giving the A_2 from pair 2 another try—no luck, as the band concludes with a new statement, B_4 , that ends the passage with a moment of rest. Nor does a pattern emerge at the supermotivic level; there is no repetition of duration at the level of the (AB) pairs, which proceed haphazardly through the progression (7, 3, 5, 4, 6), as shown in the accompanying transcription. In their quest to achieve prediction, an astute listener may note that, in each of the first three pairings, the band falls exactly one unit short of the singer’s invitation. But beyond any kind of specific patterning of the type we’ve been looking for, the vocalist’s counting can only aid the listener. This is due in part to

0:00 ♩ = 178

Vocals

Guitar

Drum Set

(AB)₇ A₄ B₃ (AB)₃ A₂ B₁ (AB)₅ A₃ B₂ (AB)₄ A₁ B₃ (AB)₆ A₂ B₄

one! two! three! four!

one! two! three!

one! two!

Example 4.28. A transcription of a passage from “Your Goose is Cooked” by Mayors of Miyazaki (Mayors of Miyazaki, 2008)

the alternation of the call-and-response structure, wherein the final number shouted by the singer is allowed to hang uncontested in the listener's verbal memory while the band plays its seemingly disconnected response. This is metric induction made explicit; no longer does the listener need to actively count in their own head, nor maintain an abstract sense of duration. Mayors of Miyazaki's singer is doing an important part of the listener's work for them, freeing up resources for higher-level predictive activities.

Counting of a very different sort crops up in "Enderbachie" (2018) by the American indie group Thingy, transcribed in Example 4.29. The passage begins with a rather metrically stable 6-unit, which proceeds unaltered for three bars, though multiple internal groupings of the 6-unit are suggested. Then, quite suddenly, the voice enters and, as in "Your Goose is Cooked," shouts "one, two, three, four." Yet these numbers perform a quite different function here. For one thing, the song is already well underway, undercutting the count-off association; this is further weakened by the singer's eighth-note rhythm, which articulates the unit pulse rather than the tactus. Second, there is no real call-and-response; the band takes a break from the flowing arpeggios of the 6-unit bars to underscore the vocalist with accentuated attacks. And third, these counted portions are fundamentally intrusions. The counting is first and foremost an enumeration of the length of the interruption, a counting-down (up) of the time until the primary musical material of the passage can once again resume. This gives it a very different affective quality than the Mayors of Miyazaki track, in which everyone was in on the durational game being played. Yet as in that song, the counting is ultimately helpful as a memory aid; a first-time listener, after hearing the four count of the first interruption, will no doubt expect the same duration when the second count begins, as that final "four" will remain prominent long past its articulation. Yet here we encounter the progressively increasing difficulty of the passage: the first interruption is jarring enough, appearing as it does out of nowhere to interrupt the downbeat pulse. Yet the second interruption, although now familiar and perhaps partially expected, is even more disruptive, as it upends

0:18 ♩ = 190

Vocals

Guitar

Drum Set

6 3 6 6 6 4 6 6 etc.

one two three

one two three four

Example 4.29. A transcription of a passage from “Enderbachie” by Thingy (Thingy, 2018)

the previously stable tactus pulse, forcing the listener to make a serious entrainment adjustment. Although this 3-unit is hinted at in the groupings of the 6-unit in mm. 2 and 6, the consistency of the quarter-note pulse in the drums is such that the 3-unit will remain only a latent suggestion until it is foisted upon the listener in the second interruption. Perhaps, as a result of this explicit counting to three, the 3-unit will become a more likely candidate for entrainment in the bars to come.

The Prominence of Seven and Six

Two durational spans, when paired together in irregular combinations, present unique kinds of MDM experiences. By keeping duple and triple in play at multiple levels of the metric hierarchy, spans of 7 and 6 are able to create unpredictable rhythmic sequences while limiting motive statements to a restricted set of options. 6-unit statements are variability index (VI) 2 “Kirnberger” meters that must contain at least one triple relation between adjacent pulse levels; (222) presents a triple relation between the span and intermediate pulses, while (33) presents it between the intermediate and unit pulses. The 7-unit is much more variable. Spans of 7 must be divided into an irregular pulse that contains groupings of both 2 and 3: (223) is most common in this repertoire, though (322) and (232) are also possible. This creates meters of VI 3 when the irregular pulse is slower than the tactus, and VI 4 when the tactus is the irregular pulse.³³ Both the (222) 6-unit and the 7-unit are capable of hinting at pure duple as they are in the process of becoming; therefore, although VI 1 meters are impossible when spans of only 6 and 7 are present, they may remain in play by way of suggestion.

Passages of MDM that are restricted to spans of 6 and 7 crop up frequently in popular music. One very brief example of this interplay is the opening riff to “People Staying Awake” (2007) by the American instrumental math rock band Sleeping People, transcribed in Example 4.30. At first pass, this riff seems simple enough: regular alternation between 7-unit and 6-unit statements of the same

³³ See the discussion of the variability index in Chapter 2, Part I.

Example 4.30. A transcription of a riff from “People Staying Awake” by Sleeping People (*Sleeping People*, 2007)

syncopated, Phrygian-inflected motive produces a recurrent 13-unit supermotive which, if invariant, would be much too regular to afford Motive-Directed Meter. However, two features of the internal structure of these statements might suggest to a listener that the riff is more metrically complex than it appears on the page. First, unfamiliar listeners will be guided by binary preference and stylistic familiarity to expect pure duple metric structure at the outset of the riff. Since the beginning of the 6-unit statement is not well-defined, it is quite easy to hear the opening quarter note F of the second statement instead as the final tone of an initial 8-unit that resolves a “neighbor note” figure, F – G flat – F, as shown in Example 4.31a. Only after hearing the characteristic syncopated gesture D – E flat – D— which this neighbor note figure would mirror—does the downbeat function of the F that initiates the 7-unit become clear in retrospect. Second, the slightly different beginning of each statement is significant in that the opening of the 7-unit is extremely similar to the “missing” truncated ending of the 6-unit. In other words, that first G flat of the 7-unit may initially be heard as the final beat of another 7-unit, as shown in Example 4.31b, and only retrospectively understood for its initiatory role. Both statements therefore play the same game, toying with the listener’s sense of arrival to create an ambiguous shifting landscape of durations that can seem to range from five to eight quarters in length. Although only one repetition of the riff is notated in Example 4.30, the drum and guitar parts do change slightly with each

repetition, sometimes underscoring—and thereby encouraging—these false metric leads. Variations notwithstanding, the riff does repeat ten times in succession at the song’s opening, providing a listener ample time to decipher this metric puzzle.



Example 4.31a. An initial “false” hearing of the first, 7-unit motive statement of “People Staying Awake”



Example 4.31b. An initial “false” hearing of the second, 6-unit motive statement of “People Staying Awake”

A more substantive example of exclusive dialogue between spans of 6 and 7 comes from Rolo Tomassi, in the heavily distorted opening section their 2018 track “A Flood of Light,” transcribed in Example 4.32. There is no metric ambiguity in this example: the drum articulates the intermediate pulse, which differs from bar to bar only by its ending, and all chord changes fall squarely on points of arrival. There isn’t much in the traditional melodic sense of “motive” here, but the guitar and drums working in

0:40 $\text{♩} = 246$

Voice

And I fall in to your o - pen arms — sound - ly em - braced here

Drum Set

Vox.

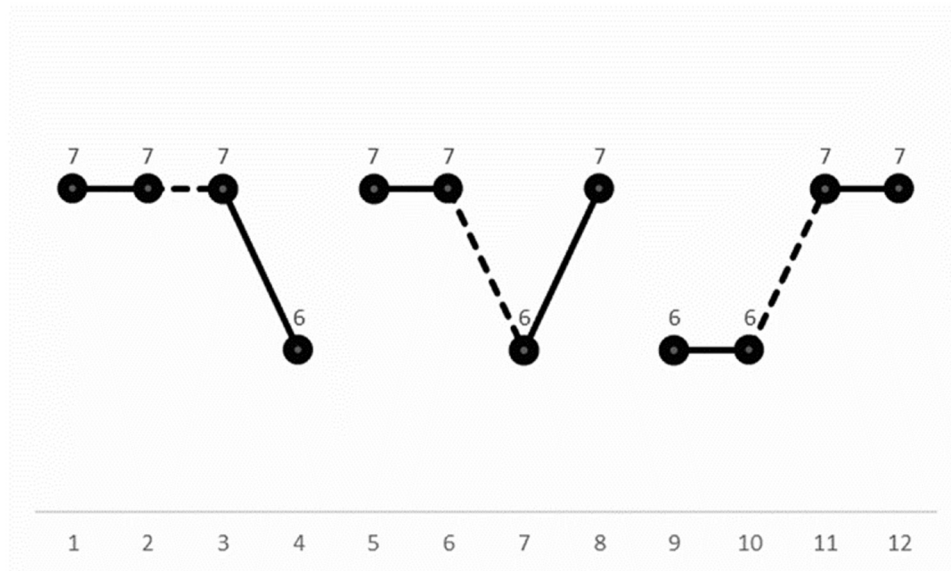
D. S.

Example 4.32. A transcription of an excerpt from “A Flood of Light” by Rolo Tomassi (Rolo Tomassi, 2018)

tandem are more than sufficient to produce clear sensations of downbeat. The vocalist, when singing clear tones, floats somewhat freely above these rigid rhythmic patterns, but the screamed words in measures 1-2 and 9-11 fall squarely on arrivals, underscoring the inescapability of these metrically deep moments.

As in "People Staying Awake," only the 6-unit and 7-unit are present here. The hypermetric structure of the passage, given in Example 4.33, underscores the complexity of the alternations between these two durations. All four possible statement pairs make an appearance: (77) occurs three times, including at both the beginning and ending of the passage, while the other pair types appear once each. Furthermore, all three four-statement sets are distinct. Given this variability, a listener will not have much success in turning to supermotivic levels for metric guidance. Instead, let's consider the way in which these durations unfold in sequence. The excerpt begins with three 7-unit statements of consistent duration and harmony (D minor), pushing back the sensation of MDM until roughly a third of the way through the passage, when the F major harmony arrives one quarter note earlier than inertia anticipates. This first 6-unit of m. 4 coincides with the first harmonic change, the G minor harmony that serves as a transition to the more prominent F major of m. 5. A listener may then associate the shorter duration with the less consequential harmony and expect such associations to continue moving forward. The beginning of the second set (mm. 5-8) would bear this out, at first. Two 7-unit statements with consistent harmonic support (F major) would seem to echo the structure of the first set, thus encouraging a listener to project the same pair of spans to conclude set 2. Although set 2 is the same total span as set 1 (27 quarters), the arrangement of statements is distinct. In set 2, both the 6-unit and the harmonic change to C major arrive a bar earlier than expected, in m.7 rather than m. 8; this bar is also the first instrumental moment so far in the section. This may produce the feeling of transition a bar early, but the instrumental C major then repeats in bar 8; the arrival of m. 8 is simultaneously the moment that the listener notices the unexpected, just-completed 6-unit, as well as that C major is

reconfirmed for a second bar. Thus truncation and extension overlap, producing a jarring moment that is only ameliorated by the change of harmony and return of the voice at m. 9, the clear arrival point of the third and final set.



Example 4.33. The structure of the passage from “A Flood of Light”

Set 2 plays with inertial expectations derived from set 1, while set 3 (mm. 9-12) introduces something demonstrably new. Note that, due to binary preference, a new listener will likely expect two or four sets to comprise the phrase, rather than the triple set of sets shown in Example 4.33. Given these binary expectations, the arrival of set 3 (m. 9) will initially be felt to be hypermetrically stronger than the arrival points of set 2 (m. 5) or a projected—but never realized—set 4 (m. 13?). The return of screamed vocals at m. 9 will be associated with m. 1, further strengthening these duple expectations at the phrase level. Although set 3 may therefore be expected to replicate the metric structure of set 1, it becomes quickly clear that this set is radically new. Two main features distinguish it from the preceding two sets. First, whereas set 2 introduced the harmonic change one statement earlier than expected (C major in the second bar of the set rather than the third), the first harmonic change of set 3 is shifted one bar earlier still, to the second bar of the set (m. 10). If a listener is indeed expecting a return of the

structure of set 1, this shift will occur two bars earlier than expected. In addition, this final set articulates one more additional harmonic change than sets 1 and 2, intensifying the feeling of acceleration effected by the shifted harmonic changes. Second, set 3 is the first to begin with something other than the (77) statement pair; this means that, whereas a listener could maintain set 1-derived expectations through much of set 2, the conclusion of the first (6-unit) statement of set 3 quickly disabuses listeners of expectations for metric parallelism between sets 1 and 3. We noted that the arrival of m. 8 expresses contraction and expansion simultaneously: contraction of the duration of m. 7, which is confirmed at that point, and expansion of the harmonic area of C major and its instrumental context. Set 3 instead presents durational contraction and expansion in sequence: the (66) pair pushes forward on the words “When I fall” (on repeat the lyrics change to “When I lost”), at which the (77) set begins, stretching the final instrumental break and delaying the deepest arrival point, the return of set 1 (or the beginning of the next section).

“A Flood of Light” presents a unique type of MDM with restricted span options, which nevertheless achieves a high degree of unpredictability through extremely irregular sequencing. Note also how, by limiting span options to the 6- and 7-units, this passage also restricts VI and metric relations. Only VIs of 2 and 4 are attainable, and—since all instances of the 6-unit feature a (222) rather than (33) intermediate pulse—statements may only be related by Identity (I) or Beat cardinality (B). If passages limited to 6- and 7-units did utilize the (33) intermediate pulse, this (33) would hold no relation to the (223) span, but would hold Pulse cardinality (P) with any (222) 6-unit variants. By using only one version each of the 6-unit and 7-unit spans, “A Flood of Light” greatly restricts the options a listener must consider. Nevertheless, although a listener can only ever be one eighth early or late in any span prediction, this passage remains quite difficult because of the significant variations at multiple levels of the metric hierarchy.

One final instance of interplay between spans of 6 and 7 can be found in Example 4.34, a transcription of a section from “650us” (2008) by Mayors of Miyazaki. Here 6-units and 7-units enumerate counts of the tactus pulse itself, rather than the unit pulse, as in “A Flood of Light.” As a result, the tactus is stable throughout “650us.” Indeed, the passages do share some general similarities: each comprises an odd number of 4-statement sets that present various combinations of 6- and 7-units; a map of “650us” is provided as Example 4.35, to be compared with Example 4.33. Despite this structural similarity, the main experiential distinction between these two passages is this stability of the tactus, which ensures a baseline level of entrainment stability for a listener. This difference also has consequences for the length of statements: since both songs proceed at a similar tempo, 6- and 7-units in “650us” last nearly twice as long as those of “A Flood of Light.”³⁴ A listener who has recognized the exclusive presence of 6- and 7-units can count on a minimum of six stable quarter notes before the potential for any entrainment adjustments; this is a significant boon that allows the half-note pulse to come into clear focus in each statement, in addition to a single whole-note span. Finally, we may observe the greater stability of “650us” that arises from its more extended presentations of the same recurring span: on average, a given span is repeated 3.3 times in “650us” before a shift to a different span; in “A Flood of Light,” the average number of successive repetitions is only 1.7.

One possible predictive strategy is to expect the 6-unit at every single statement. Although this approach will often produce inaccurate expectations, in the wake of such inaccuracies, a listener can make a *guaranteed* accurate prediction for the very next quarter note, since early predictions can only ever be off by one quarter note. Given the linear flow of time, however, a listener always anticipating the 7-unit has no such retrospective advantage. Yet given the structure of this passage, I think it unlikely that a listener will adopt this strategy. As Example 4.35 shows, the section begins with a series of consistent 7-unit statements that will significantly delay the feeling of Motive-Directed Meter. Indeed, of

³⁴ The tempo of “A Flood of Light” is ♩=247; the tempo of “650us” is ♩=254.

13

7

6

6

6

E.B.

D. S.

17

7

6

6

6

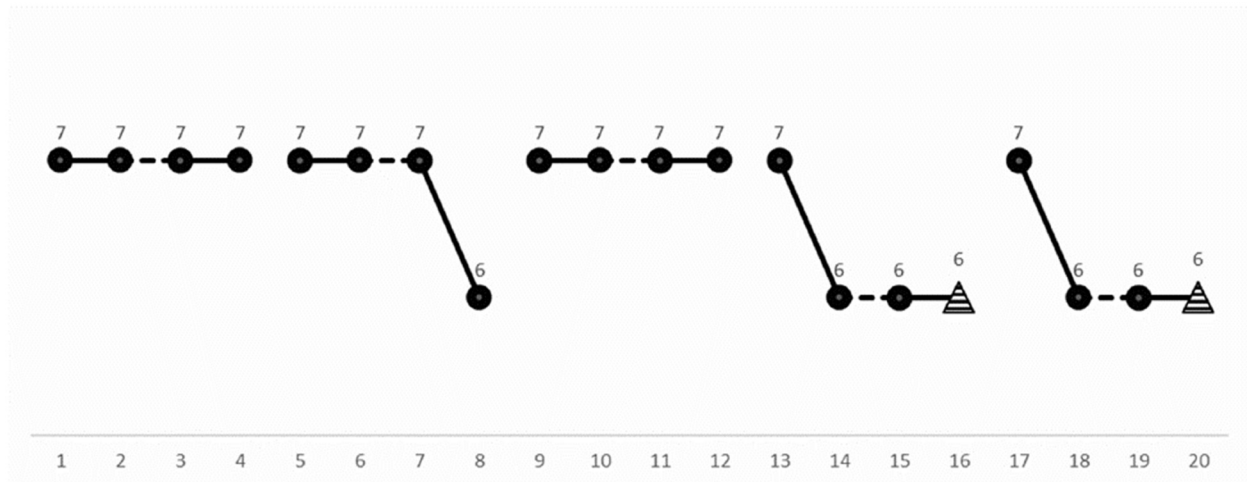
E.B.

D. S.

shel - ter no of - fi - cer un - der my stairs

Yeah!

Example 4.34. A transcription of a passage from “650us” by Mayors of Miyazaki (Mayors of Miyazaki, 2008) (continued)



Example 4.35. The structure of the passage from “650us”

the first 13 statements, only one 6-unit appears, in a transitory role to produce an “early” arrival of the voice in m. 9. The last two sets are more variable: although both present the same (7666) pattern, given the preceding prominence of the 7-unit, it may take some time for a listener to adjust, and only begin to entertain the 6-unit as a prototype form at the very end of the passage. The situation is complicated by the contrasting material of mm. 16 and 20. A listener may come to associate the 6-unit exclusively with this contrasting material, thereby falsely expecting all statements of the main material to last seven quarters.

Across “People Staying Awake,” “A Flood of Light,” and “650us,” we’ve seen three quite different approaches to creating Motive-Directed Meter out of an extremely limited set of options. Not only are the durational spans used in these three passages limited to the 6- and 7-unit, but all present a very limited range of motivic materials, as well. These examples show how significant rhythmic and metric interest can be introduced into the riff purely as a result of creative sequencing of “short” and a “long” value. Indeed, varied sequencing of longs and shorts is the basis of MDM itself, though I’ve generally discussed it in terms of “twos” and “threes” at or below the tactus pulse. Sixes and sevens constrain the relationships between twos and threes into a restricted range of options, which can keep a

listener guessing while encouraging them with predictions that are very nearly accurate. Before turning to consider how MDM operates in more substantial sections of popular music, we take a brief interlude to consider a kind of metric experience closely related to MDM, one which crops up in a number of genres of popular music.

Progressive Meter in “Story 2”

The rhythmic and microrhythmic complexities of vocal flow in rap music have received increasing scholarly attention in recent years.³⁵ The regular metric structure of much rap music facilitates this rhythmic variety, serving as a stable reference point against which the voice can be free to push and pull. Just like popular music in general, the metric structure of rap music is pure duple to an overwhelming degree, though rappers frequently create grouping dissonances against this regular structure.³⁶ There are, of course, many exceptions to the rule, from Eminem’s use of 5-unit (22222) meter throughout “Underground” (2009) to the regularly recurring (4443) metric cycle of “Ital (The Universal Side)” by The Roots (1996). Although there are many examples of complex meters in rap music, I’ve not yet found any examples of Motive-Directed Meter in anything approaching a prototypical sense. Yet one recent track, the 2014 “Story 2” by clipping. [sic], takes meter as an active parameter, producing a complex process I’ve termed “Progressive Meter.” Progressive Meter shares many similarities with MDM, and like that phenomenon, it demands frequent entrainment adjustments from the listener. We will return to situate Progressive Meter in the Flexible Metric Space after taking a look at the metric processes in “Story 2,” the opening of which is transcribed in Example 4.36, showing the first two metric changes of the song.

³⁵ For more on the rhythmic flow of the voice in rap music, see Mitchell Ohriner, *Flow: The Rhythmic Voice in Rap Music* (New York: Oxford University Press, 2019).

³⁶ See Example 4.21 for a breakdown of meters in recent popular music.

3 0:00 ♩=220

Voice

Synth

God - smack is how the wind feels on the face of Mike Win - field on his way home from the bar where he works nights, the worst nights.

4

13 Don't no - bo - dy tip right, and be - tween the mar - riage of - ers and the fist fights, and if a - no - ther moth - er fuck - er touch his wrist, tryin' to pull him in to whis - per, he ain't

5

19 mak - in' it to mid - night. Don't they know he got a light - er in his pock - et, a match - book in his sock, and a block full of charred skel - e - tons, clos - e - ted, beg - ging to get out, he

Example 4.36. A transcription of the opening of "Story 2" by clipping. (clipping., 2014)

In this track, rapper Daveed Diggs describes the thoughts of main character Mike Winfield during his late night walk home from work. The story starts out mundane, but as we learn more about Mike's dark past, the tension begins to gradually build. Mike is then suddenly pulled from his thoughts at the song's midpoint, initiating a panic-stricken drive towards the song's tragic concluding climax. Underscoring this narrative is a prominent synth bassline and drum kit, along with some other synth lines and pads that enter at various points; only the bassline and voice are transcribed in Example 4.36, though crucially, a high synth "chirp" of indistinct pitch occurs at every notated downbeat until the metric modulation at the song's midpoint, discussed below—these are represented with accented onsets in the bass. These chirpings are also represented in the official music video by brief cuts that interrupt the film's flow, making these arrival points impossible to miss.

Of course, downbeats wouldn't need such heavy-handed articulation if they were evenly spaced, as in prototypical meter. Yet, as summarized in Example 4.37, the meter changes quite often, though not as frequently as we are used to seeing in Motive-Directed Meter. The song is split in half at the aforementioned moment of panicked realization, at the point of metric modulation indicated on the left side of Example 4.37.³⁷ This moment is notated in Example 4.38, which shows the last three bars of the tempo area 1 to the first metric change of tempo area 2. Both tempo areas describe a gradual expansion of span from the 3-unit to the 8-unit; in the first half, the span of the synth bass's motive matches these durations, but it continues to grow past the song's midpoint rather than shrinking down to the new 3-unit, becoming a multi-measure structure, as seen at the end of Example 4.38. Downbeats of each bar are clear, but until a listener grasps the game of span expansion that plays out in each song half, each new change will force an entrainment adjustment, and, particularly when the durations are short, these moments are fairly closely spaced. Of course, an experienced listener will have as a

³⁷ The tempo of the second half of the song is therefore 1.5 times that of the first half.

reference point Daveed Diggs' vocal flow, which always conform to felt downbeats, though there are grouping dissonances of the intermediate pulse.³⁸

	Pattern length			Meter		
Tempo area 1	3		<i>x4</i>	6	33	<i>x6</i>
	3		<i>x8</i>	8	2222	<i>x4</i>
	4		<i>x8</i>	5	23	<i>x8</i>
	5		<i>x8</i>	6	33	<i>x8</i>
	6		<i>x8</i>	7	223	<i>x8</i>
	7		<i>x8</i>	8	2222	<i>x8</i>
	8		<i>x8</i>			
Metric modulation	(8)	12 (3)	<i>x6</i>	12	3333	<i>x6</i>
Tempo area 2		16 (4)	<i>x2</i>	8	2222	<i>x4</i>
		20 (5)	<i>x2</i>	5	23	<i>x8</i>
		24 (6)	<i>x2</i>	6	222	<i>x8</i>
		28 (7)	<i>x2</i>	7	223	<i>x8</i>
		8	<i>x8</i>	8	2222	<i>x8</i>

Example 4.37. The metric patterns of "Story 2"

Although the progression from the 3-unit to the 8-unit is evident in both halves of "Story 2," this is a point where structure and perception diverge. The right side of Example 4.37 gives my metric hearing of the passage. In both halves, I hear the pairs of 3- and 4-unit statements combined into 6- and 8-unit statements, respectively; the irregularity of the 5-unit then snaps my attention down to that irregular level, from which it grows steadily to the final 8-unit of each half. This divergence is a result of the brevity of the 3- and 4-units, particularly in the quicker second tempo area. My felt experience is therefore not exactly one of constant expansion, though the motive statements in the bass do still grow throughout without interruption. Perhaps surprisingly, under my metric interpretation, each of the meters in the same positions of the two song halves features the exact same number of repetitions, as shown by the italicized counts on the rightmost side of Example 4.37. Looked at schematically, the only

³⁸ Internal groupings are more variable in the sections of irregular meter; see, for example, mm. 21-28, which feature both (23) and (32) groupings of 5.

1:08 8

49

nev - er shake when you wake up in re - cov - er - y, sud - den - ly no - tic - ing ash is cov - er - ing his head 'cause it's rain - in' from the sky, dials home on his

12 (3)

52

cell phone and gets no re - ply. WHAT THE FUCK? Where is the ba - by - sit - ter that he o - ver - pays? Bo - dy takes o - ver and brain be - comes dis - en - gaged.

55

Mi - chael is run - ning, his house is three blocks a - way, a - dren - al - ine com - pen - sat - ing for change in age since the last time that he ran, and god damn it, Mike

4

58

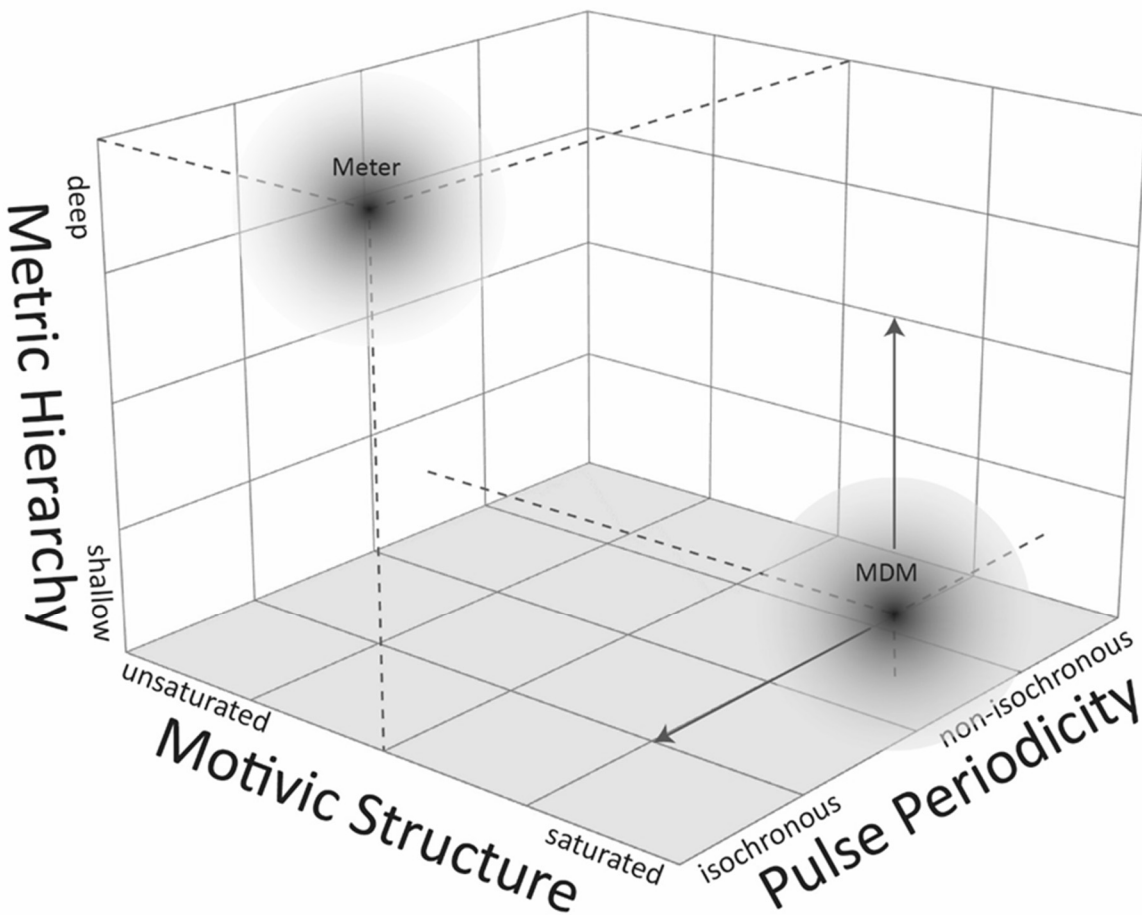
knows he got to get home fast as he can. Looks up in the sky, glow's fa - mil - i - ar, knows those fam - i - lies died with sim - i - lar

Example 4.38. A transcription of the period before and after the metric modulation in “Story 2” (clipping., 2014)

metric differences between the two halves are 1) the first durational span, which is (33) in the first half and (3333) in the second; and 2) the divergent intermediate pulses of the 6-unit, which are (33) in the first half but (222) in the second. Yet in practice, the felt experience of the second half is drastically different due to the changed relationship between the bass and the metric structure, as well as the significantly increased tempo of part 2.

“Story 2” comes close to evoking an experience of mono-motivic Motive-Directed Meter, though ultimately each metric span remains stable for too long; after each entrainment adjustment, a listener has time to fully settle in to that new meter before a new shift is enacted, resulting in a stepped progression of metric states with unambiguous directionality. This is quite unlike prototypical MDM, in which upcoming spans, as well as the point in time of the next metric change, are generally unpredictable; for these reasons, I describe the structure of “Story 2” as “Progressive Meter” rather than Motive-Directed Meter. Despite these differences, the processes have much in common: both are guided by motivic information, and both force frequent entrainment adjustments, keeping meter in play as an active musical parameter. Trendlines for “Progressive Meter” as found in “Story 2” are shown in the Flexible Metric Space depiction of Example 4.39. This representation shows how motivic saturation is crucial in both of these non-standard forms of metric organization, but as a result of the longer stretches between metric shifts in “Progressive Meter,” hierarchic depth and pulse periodicity approach prototypical meter. “Progressive Meter” is similar to meter in much math rock, which, like “Story 2” often express passages of stable, consistent meter that change periodically.³⁹ All told, “Story 2” marks a compelling engagement with meter in a genre which typically prioritizes other parameters, and an extremely musical example of vocal flow that remains tractable and smooth as it adjusts to ever-new metric environments.

³⁹ See Theo Cateforis, “How Alternative Turned Progressive: The Strange Case of Math Rock,” in *Progressive Rock Reconsidered*, ed. Kevin Holm-Hudson (New York: Routledge, 2002).



Example 4.39. The FMS depicting how “Story 2” pushes towards prototypical meter in two of the three dimensions of the FMS

Sectional Parallelism

So far, we’ve looked mostly at instrumental riff sections and brief one-off vocal sections, such as those in the counting-based “External Enumerator” subsection of this chapter. In this section, we’ll look at some major song sections, which feature all performing forces contributing to effect Motive-Directed Meter.

Motivic parallelism has been a foundational proposition throughout this dissertation; Chapter 1 described how the moment of motivic recognition activates specifically *metric* expectations derived from the metric associations that listeners have developed through prior exposure to that same

motive.⁴⁰ In cases of clear sectional divisions, as in much popular music, we can extend this idea to a larger scale to produce *sectional parallelism*. According to sectional parallelism, listeners, upon recognizing the beginning of a specific song section, activate a whole *set* of metric and motivic associations derived from prior exposure to that section, either earlier in the song or in previous listening experiences. In cases of Motive-Directed Meter, expectations may vary significantly between different sections of the same song. Furthermore, sectional parallelism is fundamentally more complex than motivic parallelism, since it includes that more familiar phenomenon, in addition to other information, including the section's constituent motives, their sequencing, and the particular forms those motive statements will take. We will look at three examples of increasing scale and complexity to see sectional parallelism at work.

Consider first the main verse of “Old Man Skies” (2013) by indie pop artist Oshwa, which appears after a brief introduction and again near the song's conclusion, transcribed in Example 4.40. The section is an intensifying set of expectational denials. The first two bars set up a stable pure duple structure (44) that is then thwarted upon repetition by the truncated ending of m. 4, which produces a (43) pair. Measure 5 then introduces radically new material that compacts the setup and denial of expectation into only two bars, presenting a 3-unit only once before replacing in with a 4-unit variant. This unexpected 4-unit is particularly difficult, since the extension consists of material that contrasts with the main “yoo-hoo” material of mm. 3-4 and acts as a pickup to m. 7; it will therefore likely be briefly heard as the beginning of a new statement until the downbeat of m. 7 makes its anacrustic function clear. Whereas the listener experienced truncation across mm. 1-4, they are then met with expansion in mm. 5-6. The final two bars return to the feeling of truncation and intensify it, as it extends across only two bars now and concerns shorter durations, in which the 2-unit follows the 3-unit. This

⁴⁰ See Chapter 1, Part I.

0:15 $\text{♩} = 134$

Voice

4 4 4 3

I've been a long time sing-in' this song, sing-in' this all way home, and I been a long time sing-in' this song, sing-in' this our way,

3 4 3 2

5 yoo - hoo, yah - hoo, yoo - hoo, yah - hoo, on and on, and on, and on

Example 4.40. A transcription of a section from “Old Man Skies” by Oshwa (Oshwa, 2013)

greatly accelerates the push towards the significant upcoming downbeat, which is either a repetition of the section or the arrival of the next.

In addition to the general features a listener may extract from any section, certain *metric* features may stand out and become associated with this section upon its next recurrence. At the very least, a listener will remember the feeling of unpredictability that differentiates it from other more metrically stable song sections—but we can be more specific than this. Attending to motivic structure, the threefold division of the section into subphrases, lasting 4, 2, and 2 bars in turn, is clear, and thankfully, the expectation denials correspond to the arrival of each of these three subsections. A listener may therefore register that it was subsection arrivals in particular that threw them off the track. The unexpected loud “yoo-hoo” material of subsection 2 becomes doubly unexpected by arriving one unit “early”—a listener may register this correlation next, and furthermore, that subsection 3 (“on and on”) arrives a bit late, and that subsection 1—on repeat—arrives *very* “early,” because of both the truncation of m. 8 and the shortened statement lengths in subsection 3 relative to the other subsections. These general perceptions become re-activated and refined upon each recurrence of this section; eventually, of course, a listener will be able to memorize the exact sequence of statements and predict it from the very outset of the section.

A second more lengthy example can be seen in a final passage from Rolo Tomassi, “Aftermath” (2018), transcribed in Example 4.41. Like “Old Man Skies,” “Aftermath” contains considerable metric difficulty. But whereas all repetitions of the 8-bar phrase of “Old Man Skies” were identical, allowing the listener to apply and refine a single set of expectations upon each sectional repetition and recurrence, the three phrases of this “Aftermath” section are differentiated from each other by variations that accrue on top of the significant metric changes already present within each phrase. The three phrases of “Aftermath” are depicted on separate systems in Example 4.41 to highlight the relationships between them. Note that in this and future transcriptions I’ve indicated durations relative to the tactus note

0:00 ♩ = 162

4 **3** **4** **2** **4** **5** **4** **5** **2**

Abmaj7 **Ebmaj7** **Cm** **Abmaj7** **Bb** **Cm**

Voice: In - prac - tice past, I'm clos - ing — off —

Drums: *

10 **4** **3** **4** **2** **4** **6** **9** **2**

Abmaj7 **Ebmaj7** **Cm** **Abmaj7** **Bb** **Cm**

Vox.: Un - teth - ered by vi - sions — Un - fa - mil - i - ar

Dr.: *

18 **4** **3** **4** **2** **4** **5** **4** **2**

Abmaj7 **Ebmaj7** **Cm** **Abmaj7** **Bb** **Cm**

Vox.: All lines — of sight Ob - struct - ed by — light —

Dr.: *

Example 4.41. A transcription of a section from “Aftermath” by Rolo Tomassi (Rolo Tomassi, 2017)

pulse in white boxes, and inverted coloring to indicate counts referring to the subtactus pulse.⁴¹ This sharp contrast mirrors the affective power of these durations that disrupt the tactus, causing them to stand out against a more stable backdrop of tactus-maintaining metric shifts.

Each of the three phrases of this section—which itself occurs twice at two separate points in the song—begin in metrically identical ways, but diverge from one another near their respective conclusions. They begin with two pairs featuring intensifying truncations, (43)(42), followed by a final 4 that precedes the varying material that closes each phrase. In phrase 1, a 5-unit is paired to that final 4, in which a vocal pickup underscored by a tom fill points to the clear location of m. 7's downbeat. These final three bars are most interesting of all, as they shake up the clear pairing of bars found so far: another 4-unit in m. 7 is followed by a surprising bar of 5 eighths that disrupts the previously stable quarter pulse, and a final 2-unit that reasserts the location and dominance of the quarter note tactus by strongly accenting it. While the exact location of the beginning of phrase 2 will still be difficult to locate, the forceful articulation of the tactus in m. 9 will at least give a listener time to entrain to it before phrase 2 starts. In phrase 2, the 5-unit expansion we saw in phrase 1, m. 6 is further expanded into a 6-unit in m. 15, and features the addition of a second vocal pickup and set of tom fill notes. What had been a clear cue in phrase 1 is reconfirmed as a cue in phrase 2, but although it still predicts the fact that an arrival is oncoming, its now-variable length means that it can no longer predict *when* that arrival will occur. Then, in place of the disruptive set of 5 eighths of phrase 1, m. 8, only a single eighth is added to m. 16, which once again disrupts the quarter pulse, and which is again corrected by the decisive concluding 2-unit of m. 17. Phrase 3 would seem to return to the structure of phrase 1 with its placement of the 5-unit in m. 23, though the use of two vocal pickup notes here might initially suggest a 4-unit to a listener prepared for a single pickup, as in phrase 1. Following this, the final phrase presents a truncated final few bars, in which the added eighths of phrases 1 and 2 are not present at all—nor,

⁴¹ These subtactus counts will instead be underlined when referred to in text.

indeed, is the final chord change to C minor that redirected previous phrases back to the beginning of the next upcoming phrase. The section therefore ends with much greater metric stability, concluding with an emergent half-note pulse.

An active listener clearly has two different levels of metric change to track: the intra-phrasal shifts and the inter-phrasal changes. These levels interfere with one another, since the alterations in each phrase distort the memory of metric changes in other phrases. Only a very familiar listener could track the progression of the three phrases across this section at the song's opening and successfully predict them when the entire section recurs. Indeed, an unfamiliar listener may not at first even register that the three phrases are distinct, but may instead ascribe inaccurate predictions to their own inability to remember the imagined single invariant phrase from its most recent presentation. Once they do recognize the fact of inter-phrasal variation, they are then faced with the daunting task of tracking all three similar phrases as separate entities, given only a single presentation of each upon each instance of this section. Clearly, the expectations evoked by sectional parallelism will be confused and inaccurate for all but the most experienced listeners, but this will not prevent them from arising. Rather, listeners simply face a much longer and more complex learning process in "Aftermath" than in more straightforward invariant recurring sections such as that of "Old Man Skies" above.

As a third and final example of sectional parallelism at work, we will consider some passages from the 2014 track "EverythingChanges" [sic] by the Japanese math pop group Uchu Conbini, which features a number of different sections that each exhibit quite different metric behavior. A diagram of the sections and statement spans of "EverythingChanges" is given as Example 4.42. There are three sections that recur, each marked with different borders in this example: Verse and Chorus sections each appear twice, and an instrumental Riff occurs three times. The other major song material consists of connected Bridge and Interlude sections that appear near the song's conclusion, neither of which recurs, though the Bridge does repeat twice in succession. Other than these major sections, there are a few

brief Transitions that connect sections to one another. As Example 4.42 makes clear, each section of “EverythingChanges” is metrically distinct, presenting, in combination, a potentially overwhelming amount of information to the unfamiliar listener.

Riff		
5	4	9
		x4
Verse 1		
3	3	5
		x4
Transition		
5		
Riff		
5	4	9
		x2
Verse 2		
3	3	5
		x4
Transition		
11		
Chorus		
3	5	3
3	5	3
		x4
Bridge		
3	2	3
3	4	3
3	3	
		x2
Interlude		
4	4	4
7	3	3
9	9	9
3	3	
Chorus		
3	5	3
3	5	3
		x4
Transition		
3	3	
Riff		
5	5	
		x4

Example 4.42. The structure of “EverythingChanges” by Uchu Conbini

The climactic Chorus appears once after the second Verse and once after the Interlude; these two presentations are metrically identical. The second instance of the Chorus is transcribed in Example 4.43.⁴² The section itself consists of two repetitions of a 16-bar pattern, but the two 8-bar halves of this pattern are metrically identical. For our purposes, then, the section consists of four repetitions of an invariant 8-statement metric pattern, itself comprising two 4-statement subphrases. The first of these subphrases, (3534), follows the familiar XYZ pattern, in particular the (X – X +) variant.⁴³ The shorter 5-unit stands out by disrupting the quarter-note tactus. Furthermore, the subsequent arrival is ambiguous: I hear it as notated, but a listener may well perceive it at the harmonic change to A-flat Major; either way, the tactus is necessarily disrupted. The second 4-statement subphrase, (3533), introduces one variation, replacing that final expanded 4-unit of subphrase 1 with the prototype form 3-unit. Although the 3-unit is more metrically stable from the perspective of metric inertia, the 4-unit is what is predicted under (sub-) sectional parallelism. Thankfully, the fourfold repetition of this 8-bar phrase each time the Chorus recurs should give a listener time to memorize the patterns of each of the two subphrases.

The Verse is structured somewhat differently. Like the Chorus, this section appears twice, though these two instances are not metrically identical; Verse 1 is transcribed in Example 4.44a, and Verse 2 in Example 4.44b. Verse 1 is made up of only one subphrase, (3353), which repeats four times, giving the listener time to adjust to the single shortened 5-unit span that truncates each subphrase. A listener does not need to think on multiple levels to figure out the structure of adjacent subphrases, as in the Chorus, but need only remember which of the four statements is shortened so as to disrupt the tactus. Like Verse 1, Verse 2 comprises four repetitions of an invariant four-statement subphrase, but it

⁴² The first statement of the Chorus is distinct only in terms of key area: its first repetition of the 16-bar section is in B Major, and the second is in E-flat Major.

⁴³ Recall that underlined numbers refer to counts of the subtactus, rather than tactus, pulse, and are therefore in this case half the duration of numbers that are not underlined. These spans are instead depicted with an inverted color scheme in accompanying examples.

3:00 130 $\text{♩} = 130$ E^\flat

102

3 5 3 4 3 3 3 3

A^\flat Cm $\text{A}^\flat\text{maj}7$

110

3 5 3 4 3 3 3 3

Cm B/D $\text{A}^\flat\text{maj}7$ B^\flat x2

118

Example 4.43. A transcription of the Chorus from “EverythingChanges” by Uchu Conbini (Uchu Conbini, 2014)

1:04 27

3 Emaj7 3 B 5 B/D# 3 G#m 3 F#sus 5 F#sus/C#

35

3 Emaj7 3 B 5 B/D# 3 G#m 3 F#sus 5 F#sus/C#

Example 4.44b. A transcription of Verse 2 from “EverythingChanges” (Uchu Conbini, 2014)

swaps out the final 3-unit for a repetition of the truncated 5-unit, resulting in (3355). As with the change in the second subphrase of the Chorus, this shift is easier in some ways and harder in others. The introduction of a second 5-unit in Verse 2, a variability index (VI) 4 meter, increases entrainment difficulty, but only if a listener closely follows parallelism. The adjacency of the 5-units presents the possibility that inertia might briefly take over, smoothing (55) out into a single 5-unit statement of VI 3. Overall, the inter-sectional variations of the verses are probably easier to track than the intra-sectional variations of the choruses. The verses are separated in time by intervening material, and a listener need only learn and project a single repeating subphrase for each verse section. In contrast, the Chorus—although identical each time it appears—places metrically varied subphrases in direct juxtaposition, requiring more frequent adjustments. Nevertheless, sectional parallelism does have one advantage in the case of the Chorus, since metric expectations—once correctly formed—can be successfully re-activated at the beginning of every Chorus. Since the verses are different, however, recognition of the beginning of a verse might activate metric expectations derived from the other verse, leading to inaccurate span predictions.

The instrumental Riff section is the most varied of all. The three recurrences of this section are transcribed in Examples 4.45a-c, each of which exhibits distinct metric behavior. Example 4.45a presents the riff that opens the song, articulating a fourfold repetition of (549). This metric ascription comes with two caveats. First, the riff is itself extremely syncopated, articulating a partial five-against-four polyrhythm that, occurring as it does at the song's opening, may interfere with the abstraction phase of entrainment.⁴⁴ Second, and similarly, the intermediate pulse is articulated only intermittently—the 9-unit, for example, features no onset events other than that of its arrival point. It's therefore quite likely that a listener will hear this sustained harmony as temporarily pausing the flow of the pulse entirely,

⁴⁴ Mari Riess Jones, "Learning and the Development of Expectancies: An Interactionist Approach," *Psychomusicology* 9, no. 2 (1990).

which is only then re-activated upon the next repetition. The final fourth repetition of the riff is quite different. As the bottom of Example 4.45a shows, this fourth repetition can be heard in one of two ways: the kick drum that enters at this point may be heard as an off-beat or as articulating the tactus itself. A listener is likely to begin with the former, I think, given the strength of the arrival of the 9-unit, but then shift to the latter once it becomes retrospectively clear that the kick drum articulated four quarter notes that led up nicely to the onset of Verse 1. This retrospective reconsideration may lead to a reevaluation of the metric structure of the entire riff: was it (5 $\underline{9}$ 4) all along?

The image displays musical notation for a guitar riff, labeled 'Gtr' on the left. The notation is presented in two parts, separated by a dashed box and the word 'OR'.

Top Part: The notation starts at 0:00. It features a treble clef and a key signature of three sharps (F#, C#, G#). The riff is divided into three measures by vertical lines. Above the first measure is a box containing the number '5'. Above the second measure is a box containing the number '4'. Above the third measure is a box containing the number '9'. The riff ends with a double bar line and a repeat sign. To the right of the repeat sign is the text 'x3, then:'. The chord 'Emaj7/G#' is indicated above the first measure.

Bottom Part: The notation starts at 0:18. It features a treble clef and a key signature of three sharps (F#, C#, G#). The riff is divided into three measures by vertical lines. Above the first measure is a box containing the number '5'. Above the second measure is a box containing the number '9'. Above the third measure is a box containing the number '4'. The riff ends with a double bar line and a repeat sign. The chord 'Emaj7/G#' is indicated above the first measure. The bottom part of the notation shows a different interpretation of the riff's metric structure, with the 9-unit and 4-unit measures swapped.

Example 4.45a. A transcription of the first Riff section from “EverythingChanges” (Uchu Conbini, 2014)

0:47 23

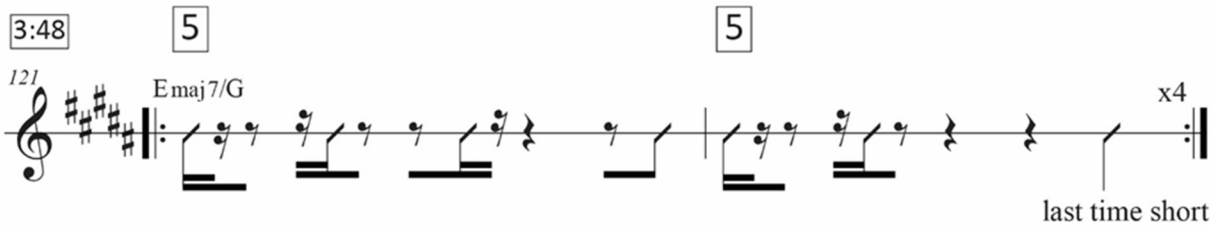
5 Emaj7/G#

4

9 G#m7

9 B/D# x2

Example 4.45b. A transcription of the second Riff section from “EverythingChanges” (Uchu Conbini, 2014)



Example 4.45c. A transcription of the third Riff section from “EverythingChanges” (Uchu Conbini, 2014)

When the Riff appears for the second time, three things have changed. First, the section is preceded by a clear 5-unit Transition, as shown in Example 4.42, clarifying the tactus—and even the span pulse—at the section’s outset. Second, all pulses are now clearly articulated with onset events; as a result of these two factors, entrainment of this second Riff instance should be much easier than the first. Third, the structure of the riff itself has changed: a second 9-unit now follows the first, complete with onsets in the drums that keep the sense of pulse going, resulting in a (5499) structure. Clear harmonic changes on the arrival of each 9-unit make these moments unambiguous, which therefore disconfirm the nascent metric reevaluation from the end of Riff 1: these sustained harmonies do not begin with pickups, after all. All told, Riff 2 smooths out many of the rough edges of Riff 1, presenting clearer pulses and a more balanced, continuous 4-statement (5499) phrase with more equal proportions ((9)(9)) than the lopsided and inconsistent (549) of Riff 1.

Finally, when the third Riff instance appears at the very end of the song, it has been radically transformed, as shown in Example 4.45c. Rather than initiating a 9-unit, the accented articulation that follows the five-against-four polyrhythmic syncopations occurs on beat 5 of a second 5-unit, acting as a quarter note anacrusis to the downbeat of the (55) unit. This newfound metric regularity is an even greater resolution of the metric complexities of Riff 1 than was Riff 2; the recurrent 5-unit requires no entrainment shifts at all, other than those necessitated by the irregular intermediate pulse of any VI 3 meter. Therefore, although the five-over-four polyrhythm remains constant throughout the song, the

three manifestations of the Riff section become progressively more entrainable as they appear. A listener wise to this game may have more luck in activating the appropriate set of metric expectations upon recognition of each instance of this brief section. While the three distinct forms of the Riff make initial predictions more difficult, the invariant intra-sectional repetitions give listeners time to synchronize with the musical signal. Across the Chorus, Verse, and Riff sections of “EverythingChanges,” we see some of the significant challenges sectional parallelism faces in this repertoire, as well as the predictive advantages to which it can give rise.

Productive Juxtaposition in “EXACO I”

Self-described “transcendental black metal” band Liturgy encapsulates the most experimental end of an often stylistically restrictive genre. Exhibiting influences from electronic and classical musics and the employment of acoustic instruments—to say nothing of the complex religious and philosophical underpinnings of the music, creations of frontwoman Hunter Hunt-Hendrix—the group is something of a stylistic enigma. This is never truer than in the band’s recent 2020 album *H.A.Q.Q.*, or “*Haelegen above Quality and Quantity*,” which outlines some elements of Hunt-Hendrix’s philosophical system. Many of the tracks on *H.A.Q.Q.* feature meter changes, but one in particular, “EXACO I,” presents many sections of prototypical MDM. “EXACO I” is the second track on *H.A.Q.Q.*, and functions as a relatively brief interlude after the sprawling metal track “HAJJ” that opens the album. While most of the album is dominated by distorted electric guitars, “EXACO I” is a piano track that projects a single line throughout. The song is transcribed in Example 4.46. Although piano is the only instrument, there are several “glitched” moments in the track, in which the audio is digitally manipulated to create a stuttering effect—these are marked with an arpeggio line above the glitched notes in the accompanying transcription.

Example 4.46. A transcription of “EXACO I” by Liturgy (Liturgy, 2019) (continued)

35
Y.2
④

36
X.3
⑤

38
Y.3
② ③

43
X.4
② ⑦

Example 4.46. A transcription of “EXACO I” by Liturgy (Liturgy, 2019) (continued)

The image displays four systems of musical notation, each on a single staff. The notation is complex, featuring many beamed sixteenth and thirty-second notes, often with repeat signs. Fingerings are indicated by circled numbers 2, 3, and 4. Rhythmic markings include 'x4', 'x7', 'x8', and 'x3'. The systems are numbered 45, 50, 55, and 61 at the beginning of each staff. The first system (45) is labeled 'Y.4' at the bottom. The notation is written in a style that suggests a specific performance technique, possibly involving rapid repetition of patterns.

Example 4.46. A transcription of “EXACO I” by Liturgy (Liturgy, 2019) (continued)

X.5

63

3

3

3

11

x3

67

3

3

3

3

Example 4.46. A transcription of “EXACO I” by Liturgy (Liturgy, 2019) (continued)

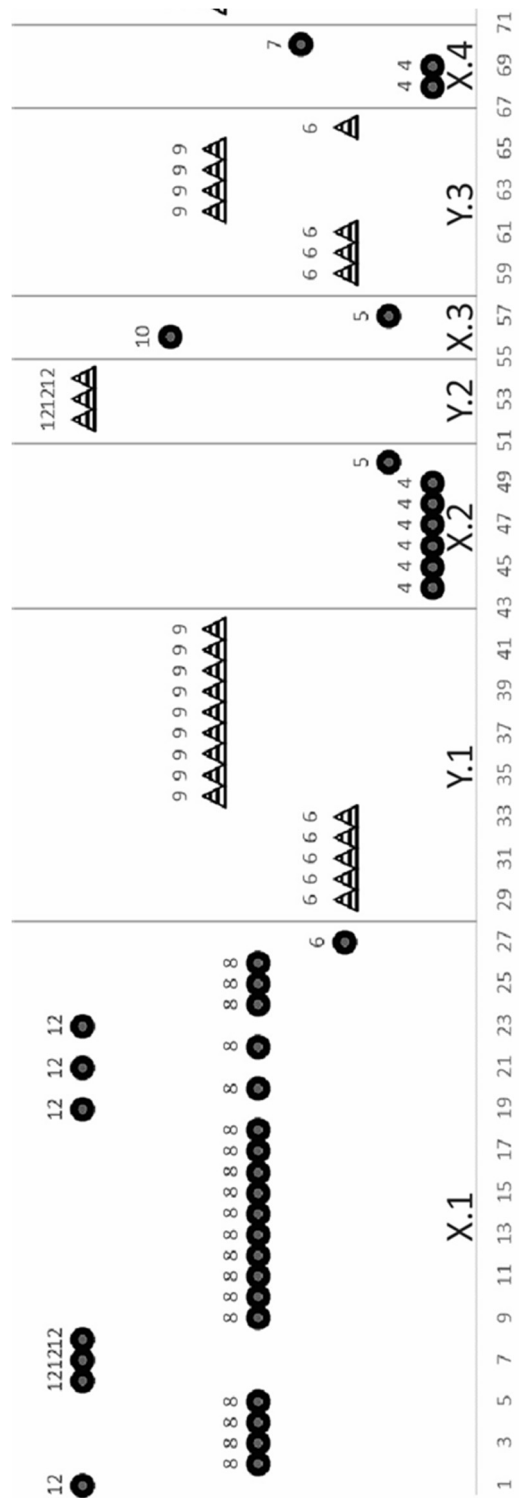
As an electronically manipulated piano track in the midst of a metal album, “EXACO I” is already a stylistic enigma. And, as we will see, the song draws on techniques drawn from popular music as well as those associated with classical composition, resulting in a complex amalgamation of influences and of metric patternings that ties together many of the disparate threads of recent composition identified in this chapter. Not only does “EXACO I” lack many of the instruments associated with popular music throughout the latter half of this chapter—particularly the drum set, guitars, and the voice—it also lacks the familiar sectional differentiation into riffs, verses, and choruses. Instead, the song alternates between two collections of quite different material, labeled X and Y. The X sections prioritize a duple relation between tactus and subtactus, while the Y sections privilege triple. These two sections alternate regularly, though their lengths and exact contents vary significantly throughout the course of the song.

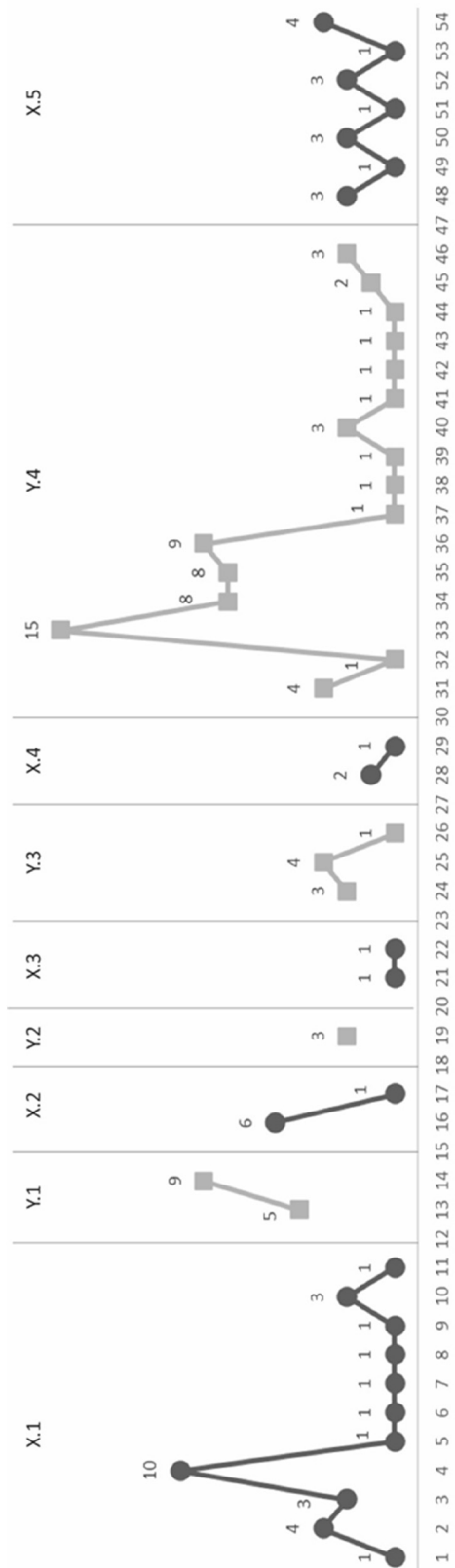
In addition to the stylistic intermingling and juxtaposition of grouping discussed above, there is a mismatch between motivic arrival and downbeat pulse in “EXACO I.” Although the motivic identity of material is quite clear throughout, and undoubtedly strong enough to encourage the parallelistic hearing required of an MDM experience in all but the most ardent of inertial listeners, there are certain points where inertia nevertheless takes over in one or more pulses. Consider the opening phrase of the song, which spans the first seven transcribed measures. The notated quarter note, progressing at 127 beats per minute, is the clear tactus—a pulse which, according to this hearing, is not disrupted throughout the entire first X.1 section until the transition bar to the beginning of Y.1. The first two statements present unambiguous 6- and 4-units, counted relative to the subtactus (eighth note) because of future interruptions (inverted colors are reserved for interruptions of the eighth pulse). Bar 3 is, however, more interesting, since this 4-unit actually comprises two 2-unit statements of the main motive. In my hearing, the force of the tactus at this point is already strong enough that it pulls towards an inclusion relation with the next-slower pulse, which, at this point, is the half note. Thus, although these 2-units don’t disrupt the tactus, the second is not sufficiently strong to bring the metric hierarchy

down to its level with a new arrival. Although the motivic structure is clear and generally encourages parallelism, not every motivic arrival is strong enough to force a metric downbeat.

The same set of 2-units recurs in measure 5. Immediately following, m. 6 offers something new: motivic spans of odd-numbered sixteenths (5 and 7) that threaten to upend not only the tactus, but even the subtactus eighth-note pulse. Although arrivals have so far been associated with metric depth at the level of the tactus or deeper, I think inertia likely to take over here, producing a 6-unit with syncopated motive statements within it, as depicted by the numbered phrase marking boundaries of Example 4.46. After all, though still recognizable, the main motive has become somewhat liquidated at this point: although the 6-unit of m. 1 featured a variety of content within a memorable motivic contour, many statements have been reduced to rising arpeggios of constant sixteenths, as in m. 6. Because of the weakened motivic identity and the affirmed strength of the quarter and eighth pulses, inertia can assert itself; indeed, a listener that continues the quarter-note pulse through m. 6 will be rewarded upon the arrival of m. 7, even if the variation between 4- and 6-units prevents exact prediction of that arrival point.

Let's take a step back and consider the structure of this song, a map of which is presented as Example 4.47. The X and Y materials alternate regularly throughout, though the size of each presentation varies widely, from two motive statements (X.3) to 60 (Y.4). This reflects a general property of the track: the opening sections (X.1 and Y.1) and closing sections (Y.4 and X.5) present much more stable extended sections of their respective materials than the more conflicted area in-between, which features rapid-fire transitions between materials and between motive statements. Indeed, there is a gradual diminishment of section length from X.1 through X.3. Example 4.48 presents a slightly different map than 4.47, displaying the number of repetitions of each span before a metric change takes place; I will refer to these as "stretches" of invariant spans. This graph shows nothing about individual statement length or stability, but can be correlated with Example 4.47 for additional information. In

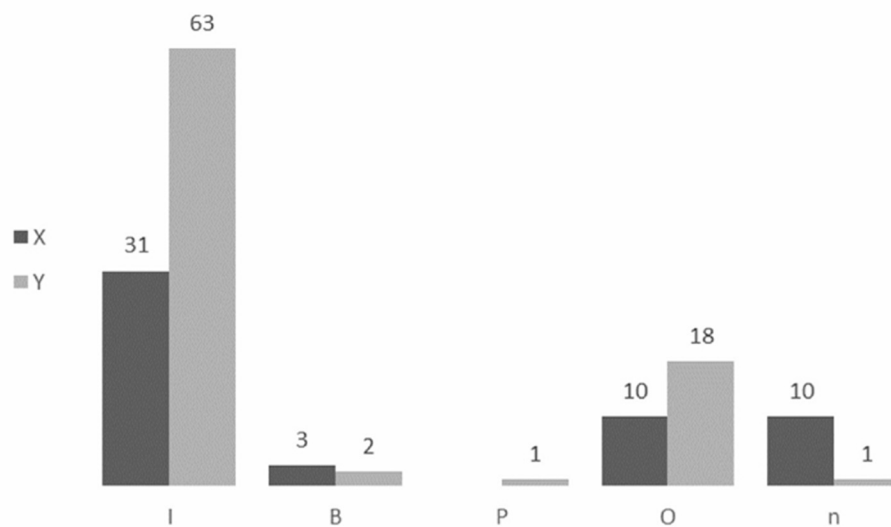




Example 4.48. A map of the number of adjacent identical span statements in “EXACO I”

Example 4.48, bigger stretches are always more stable, as they give listeners more time to abstract and entrain the relevant span.

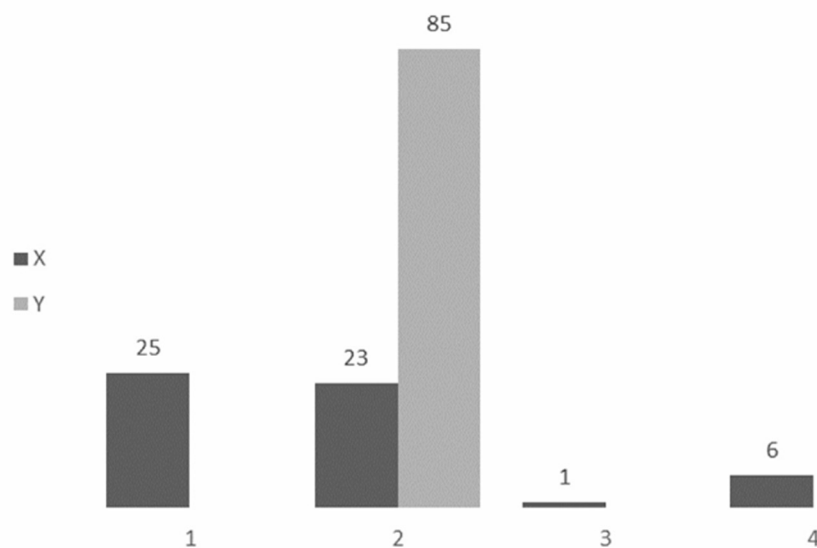
The opening X.1 section may appear somewhat more stable in Example 4.48 than it feels; this is due to the complex polyrhythmic patterning across the stable 10-statement stretch, discussed above, which adds significant rhythmic complexity to what would otherwise be a metrically stable stretch. Overall, X.1 is highly volatile. Y.1 is significantly more stable, though X.2 then precipitates a steady decline in stretch length that is not ameliorated until the expansive Y.4 section. From the high point of the 15-stretch near the beginning of Y.4, another irregular decline follows to the song's end. Note that it is the two largest Y-material sections, Y.2 and Y.4, which usher in relatively long stable stretches, though neither one persists for long. This contributes to the stabilizing power of the Y material, a feature expressed in several different domains. Consider, for example, the metric relations that hold in each section, as shown in Example 4.49. Relative to most of the Motive-Directed Meter examples we've



Example 4.49. The distribution of metric relations in the two sections of "EXACO I"

examined, there are a disproportionate number of Identity (I) relations, though two-thirds of these are concentrated in Y sections. As a result, Y sections are less evocative of MDM, and have more in common

with prototypical meter, than X sections. In sharp contrast, nearly all connections between spans that lack any metric relation (“none,” or “n”) occur in X sections; we’ll return to consider why this is the case below. In addition, Y sections are much more consistent in terms of the variability index values they present, as summarized in Example 4.50. Although the duple-based X sections are exclusively capable of expressing the most stable VI 1 meters, they also contain the only instances of the difficult VI 3 and VI 4 meters that contain irregular pulses. The Y sections are predictable: without exception, they contain VI 2 “Kirnberger” meters. The triple relation between the unit pulse and tactus never changes in these sections; only the relation between tactus and span pulse varies.



Example 4.50. The distribution of VI values in the two sections of “EXACO I”

Considering in combination the lengths of invariant span stretches, metric relations, and VIs, it’s clear that the Y sections are the relatively stable sections—despite still containing a large number of metric changes and frequently evoking MDM—and that X-based sections are more metrically complex. Yet the sequential unfolding of these contrasting sections is unlike any standard popular music song form. Instead, after the motivically consistent opening X section, we find a steady process of dissolution, fragmentation, and increasing complexity that presses with increasing rapidity towards Y.4. The

unprepared and impressive length of this final Y section is almost enough to make a first-time listener abandon any thought of X material returning; while listening to this massive section, we would seem to be experiencing a song-wide narrative of a progression from instability to stability, as in Meredith Monk's *Particular Dance* (Example 4.14) or the Riff section of Uchu Conbini's "EverythingChanges" (Example 4.45). Instead, section X appears one last time to close the track with a repeating (3,3,3, 11) phrase that continually undercuts the tactus with its final 11-unit statement. To understand this moment, let's examine where tactus-undercutting statements have appeared so far in "EXACO I."

Example 4.50 shows six total instances of VI 4 meters; three of these are the 11-units in the final X.5 section. The other three arise as a result of a mismatch between motivic structure and entrainment patterns at crucial transition points. The first can be found in m. 34, the final statement of X.2. Looking at the notation, it's clear that the final two sixteenths of this bar are actually Y material; they act as pickups to the downbeat of m. 35, and all tactus articulations of Y.2 are preceded by this same set of pitches. Yet as pickups, they become absorbed into the metric structure of the 5-unit, creating a jarring misaligned shift from X.2 into Y.2. A similar disjoint occurs at the end of X.3, where the final 5 sixteenths of a 6-sixteenth pattern—which fully arrives along with Y.3 in m. 38—are presented early, creating the feeling of arrival on the low E flat. This feeling must then be recalibrated when the full pattern arrives, since that E flat is ultimately the second sixteenth of the 6-unit that spans mm. 38-39. The eighth note-disrupting 5-unit is a product of this motivic and metric misalignment. The final and most striking example of this mismatch spans mm. 43-44, where a four-note pattern, (E flat, B flat, C, B flat) is positioned such that it is the second of these notes that will be perceived as the onset point of these 2-unit statements, as in the accompanying transcription. As a result, the final statement will feel truncated by one eighth, ultimately producing the 7-unit that awkwardly transitions into the following Y.3 section.

We have therefore seen that, by the time the final X.5 section begins, eighth note-disrupting statements have become closely associated with transition, and specifically, with the feeling of

transition out of X-material sections and into Y. Although these VI 4 statements are themselves very metrically difficult, they signal the upcoming arrival of the greater metric stability and predictability represented by Y-material sections. In this light, the three 11-unit statements of X.5 take on new meaning. To the perceptive listener, they may well signal the imminent arrival of a Y.5 that never arrives—three gestures toward a transition that keeps collapsing back on itself and restarting the sequence of 3-unit statements. In the end, across mm. 67-70, the 11-unit finally disappears, and the song concludes with a final fourth repetition of the 3-unit. The many types of mismatch presented throughout the song never do resolve; tensions between X and Y materials, and the divergent types of metric organization they represent, are left hanging, along with the final A natural that rings out at the song's conclusion.

In this chapter, we have seen Motive-Directed Meter situated in a diverse array of compositional and stylistic contexts. Among contemporary composers, MDM has become, in the work of Vivian Fine, a resource for compositional manipulations that twist and contort the sequence of metric changes, while Julia Wolfe schematizes tensions between triple and quadruple into an abstract battlefield. For Meredith Monk, MDM emerges in an improvisational context, as the result of juxtaposing motivic fragments that are stretched and squeezed into ever-new combinations. But even more importantly, we have seen that Motive-Directed Meter is not the sole purview of elite musical composition. As a result of diverse influences, MDM is firmly entrenched in popular music repertoires, albeit in rather niche genres. In this position, it has reached a broad audience, making this singular metric phenomenon much more familiar and accessible. Within popular musics, it is clear that MDM has taken on new life, becoming entwined with characteristic features of various popular music styles. Flying in the face of stylistically typical metric normativity, MDM harnesses the orienting power of the drum set, and of recurring, meter-defining riff patterns, to make changes of span readily perceptible. And

given clear song form expectations of much popular music, composers of MDM are able to create expectational hierarchies, engaging “sectional parallelism” and allowing phrases and sections to behave like motives by eliciting specific sets of associations and temporal expectations.

EPILOGUE

This project began with the observation that Motive-Directed Meter catches listeners in a state of expectational limbo. Although this fact was clear, the mechanics of that condition were much more opaque. The attendant difficulties inherent in describing and representing subjective temporal experience in words and two-dimensional images necessitated an eclectic approach to this topic, leading to the development of my multi-part analytic toolkit introduced in Chapter 2. These diverse techniques have helped to shine light on the MDM listening experience, yet it's clear that there remains much work to be done. In particular, this project was constrained to the analysis of hypothetical first-time listening experiences; this was a practical limitation that enabled the focusing of my analytic systems.

Nevertheless, we will achieve a richer perspective on the experience of MDM by refining and expanding what I've called the "stages of learning," illustrated in Example 2.27; in particular, the process of rote memorization that eventually leads to predictive mastery over a given excerpt. Such work may necessitate a deeper understanding of the mechanics of human memory, or the use of empirical techniques able to test specific hypotheses about how such passages become and remain memorized.

Writers have long observed the changing durational spans in many twentieth-century repertoires—particularly the music of Stravinsky—but a prevalent focus on composer intention has resulted in analyses that observe unpredictability from the atemporal position of *reader* rather than listener. I hope to have shown that a listener-oriented perspective enables insights otherwise inaccessible to a strictly structural, score-based approach. While this project has made use of fixed music notation as a guide, I have sought to highlight the experience of a listener moving through the sonic events represented by that notation in real time. I believe all musics are amenable to such experiential analysis, though the particular tools may vary, and that this angle is a valuable counterpart to structuralist accounts. Indeed, given the psychological perspective that views musical meter as a

phenomenon occurring in the mind and body of listeners and performers, some degree of listener orientation seems all but necessary.

The many analyses that comprise this dissertation demonstrate the usefulness of the analytic techniques employed here, yet none of these tools are limited only to the study of Motive-Directed Meter. Mark Gotham's metric relations were designed to be generalizable to any metric change, and Daphne Leong has compared differences in metric depth in ways similar to my metric displacement method.¹ Indeed, metric displacement can be used in any situation that features metric changes, no matter how infrequent, even those occurring deep in the metric hierarchy, at "hypermetric" levels. Likewise, the variability index is applicable in any analysis involving a consideration of musical meter. The three expectation-generation methods—local inertia, motivic inertia, and prototype—may be the most limited in terms of general analytic applicability, though, as mentioned above, they are important components of the "stages of learning," which has broad relevance to any listener-oriented analysis.

Motive-Directed Meter may be rare relative to other types of metric organization, but the insights gained from an experiential analytic mode have implications for the study of all metric musics. Furthermore, the flexible model of musical meter in which I've situated MDM—the *Flexible Metric Space*—is able to accommodate any musics featuring pulsation, and therefore has extremely broad applicability beyond the relatively narrow use to which I've put it here. I have argued that meter should not be considered a binary category, but rather a wide spectrum of related experiential phenomena. By situating other repertoires in the Flexible Metric Space, scholars may have an easier time drawing connections between musics hitherto thought to be presenting fundamentally distinct types of temporal organization. Such work may lead to a reconsideration of some features of the Flexible Metric Space;

¹ Mark Gotham, "Meter Metrics: Characterizing Relationships among (Mixed) Metrical Structures," *Music Theory Online* 21, no. 2 (2015).
Daphne Leong, "Generalizing Syncopation: Contour, Duration, and Weight," *Theory and Practice* 36 (2011).

indeed, this is one of the distinct advantages of the model as laid out in Chapter 1. As a set of orientational spectra, the flexible model is able to accommodate new parameters that expand its scope, enabling it to cover any aspects of the listening experience which I may have inadvertently overlooked, or which may be unique to specific cultural contexts.

Although I have covered a wide swath of musical repertoires in my final chapter, Motive-Directed Meter may be evoked by a much broader range of the world's musics than I have been able to describe here. Notably, my selection has been fundamentally Euro- and American-centric, and overwhelmingly English-speaking. With hope, now that MDM has been isolated and identified as a specific experiential phenomenon, scholars will be encouraged to seek out and study related experiences in diverse cultural contexts. Yet despite the broad stylistic relevance of the phenomenon, the passages isolated in this dissertation suggest that MDM remains an uncommon experience, found most frequently in brief, isolated passages within larger, more metrically stable pieces of music.

It may at this point be clear why Motive-Directed Meter remains a niche phenomenon. Perhaps the most salient feature distinguishing MDM from prototypical meter is the striking absence of literal repetition—repetition of durational spans, and of identically-lengthed motive statements. Elizabeth Margulis argues that part of the pleasure offered by repetition is the freedom to explore new components and hierarchical levels of the sonic signal. “Pleasure derives not from the familiarity and safety of the old,” she writes, “but rather from the excitement of learning and the new: namely, the new elements that become available to perception and cognition when attentional resources are freed from merely tracking entirely new events.”² As we’ve seen, Motive-Directed Meter is, in part, *defined by* repetition: the repetition of a small number of familiar motivic ideas. But this repetition is not literal,

² Elizabeth Hellmuth Margulis, *On Repeat: How Music Plays the Mind* (Oxford; New York: Oxford University Press, 2014), 71.

and the most salient type of variation used in MDM—durational variation—*does* trap a listener in a state of tracking new events, at least until they become very familiar with the music.

Although the constant durational variation of MDM precludes easy exploration of all that a piece of music has to offer, it may thereby delay that piece's becoming stale, effectively placing deep familiarity behind a significant barrier that takes time to break down. In this way, Motive-Directed Meter presents a kind of puzzle to the listener that can only be solved gradually, and in which each repeated hearing is a new opportunity to make progress, keeping listeners coming back for more. This dissertation has highlighted the manifold ways in which musics that afford MDM present significant challenges to a listener's predictive machinery. For those who are game, the pleasure of gradually solving these puzzles may outweigh the combined cost of every entrainment adjustment enacted along the way.

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